THIS WEEK'S National Petroleum NEWS

Index to Coming Meetings

Mid-Continent District, American Petroleum Institute, Division of Production, Mayo Hotel, Tulsa, May 23 and 24.

Society of Automotive Engineers, French Lick Springs, Ind., May 25 to 29.

Conference on Grease Equipment, American Petroleum Institute and *Conference Committee on Weights and Tolerances, Washington, D. C.,* June 2.

West Virginia Oil Marketers Association, Daniel Boone Hotel, Charleston, W. Va., June 12, 13.

American Society for Testing Materials, Atlantic City, N. J. June 23 to 27.

North American Gasoline Tax Conference, King Edward Hotel, Toronto, Ont., Sept. 2, 3, 4.

American Chemical Society, Hotel Gibson, Cincinnati, O., Sept. 8 to 12.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., Sept. 17, 18, 19.

National Safety Council, Petroleum Section, Pittsburgh, Pa., Sept. 29 to Oct. 4.

Big Four State Jobbers Convention, (Missouri, Iowa, Kansas and Nebraska) Kansas City, Mo., Oct. 14, 15, 16.

American Petroleum Institute, Stevens Hotel, Chicago, Nov. 10 to 13.

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North Dome of Kettleman Hills From the Air

AIR view of part of the north dome of Kettleman Hills in California taken by the aerial survey department of The Texas Co. (California). This is only one of the many thousands of photographs taken by the company as an aid to its geologists in tracing earth formations. In this view the outline of the dome can be seen with great clearness.

The Texas Co. (California) has mapped approximately 6500 square miles from the air, using some 20,000 photographs. In January the company completed a survey of the Salinas Valley which required 75 flying hours of which 64 were used in actual surveying. The area mapped is the largest of its kind in the United States and was mapped in 18 flying days.

Recently The Texas Pipe Line Co. mapped a route for a pipe line in Texas from the air, creating a large saving in time and money.

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Vol. 22 CLEVELAND, May 21 No. 21

Sinclair to Take Over Business Of Pierce Petroleum Corp.

By Roger B. Stafford
N. P. N. STAFF WRITER

CLEVELAND, May 19

SINCLAIR Consolidated Oil Corp. has contracted to buy the assets and business of the Pierce Petroleum Corp. Closing of the deal is subject only to ratification by Pierce Petroleum stockholders. A meeting for this purpose will be held June 12. Ratification is virtually assured.

Sinclair is to pay for the assets and business with Sinclair Consolidated common stock. The rate will be a little more than one share of Sinclair for four of Pierce Petroleum. Sinclair will provide money to retire the Pierce Petroleum preferred stock. It will assume all liabilities.

Pierce Petroleum Corp. was organized about six years to take over the assets and business of Pierce Oil Corp. The latter received 1,103,419½ of the 2,500,000 Pierce Petroleum common shares as a consideration. Pierce Oil has been solely a holding company the last six years and probably will continue as such.

The assets that Sinclair will receive, include 707 bulk distributing stations and 969 service stations in the United States, and 183 distributing agencies in Mexico. Pierce also will turn over an 8000-barrel refinery at Sand Springs, Okla., a skimming plant at Tampico of 4000 barrels daily capacity, an ocean terminal at Texas City, Texas, 400 miles of pipe lines, and interest in several thousand acres of prospective oil lands. Sinclair will also get Pierce Petroleum Corp.'s net current assets which amounted to $5,000,000. Dec. 31, 1929.

H. F. Sinclair had this to say of his company's probable acquisition:

"The Pierce distributing facilities are peculiarly advantageous to our company. There are practically no towns in which both companies have duplicate distributing plants. Addition of the Pierce facilities to those already established by Sinclair gives our company complete coverage from the Gulf to the Lakes in the whole middle western section of the country. In Texas, Oklahoma, Missouri and Arkansas, we acquire immediately more than 1500 bulk and service stations with a settled demand which will now be met with Sinclair products.

"This is one of those deals that are equally good for buyer and seller. It is advantageous to Sinclair because of the marketing facilities we acquire in territory that we are able to supply with our own products; it is advantageous to Pierce because without production, refining capacity and distribution—which would cost millions to provide—it can not progress.

"Considering only the most important consuming centers, Sinclair now has distribution facilities in 78 of the 100 principal markets of the United States. This number will be increased to 85 by the Pierce acquisition, which means that Sinclair will have direct representation in all except 15 of the largest consuming centers of the country and will be selling gasoline actively in all of the heavy consuming states with the exception of Pacific coast states. All of the seven chief centers added through the Pierce acquisition are in the south central area where there is all year-round demand."

According to Samuel Untermyer, a large stockholder in the Pierce Petroleum Corp., Pierce Petroleum Corp. will be able to pay dividends of about 50 cents a year a share from the dividends it will receive from the Sinclair common stock which is on a $2 a year basis.

A statement from Mr. Untermyer, two of whose sons are directors of Pierce Petroleum, said in part:

"There is apparently no place in the oil business in this country for small companies without production. The business is becoming more and more centralized in large units and Pierce Petroleum Corp. has, accordingly, found itself unable at any time during the six years of its existence to pay any dividends whatever, nor were the prospects for the payment of a dividend encouraging for the future. As an integral part of the Sinclair company its plant and distribution facilities will be of far greater value than if operated alone. If, as we believe, Sinclair stock increases in value and returns, the Pierce stockholders will share in that prosperity."

Pierce was the pioneer petroleum marketer in Mexico. It has marketed oil there more than 50 years. It has approximately a fourth of the business in that republic today, where its agents or distributors are in 227 cities and towns.

The company is said to have

Map showing extent of Sinclair and Pierce distribution in the United States and Mexico. Sinclair refineries are indicated by stars. The Pierce refineries at Sand Springs, Okla., and Tampico, Mexico, are not indicated. Sinclair pipe lines are shown

operated the first tank wagon ever used in the distribution of petroleum products. That was in St. Louis.

The Pierce enterprise is said to have been started about 75 years ago as John Finlay & Co. That was before the drilling in of the Drake Well. With the birth of the oil industry, the firm began to distribute oil. In 1869 the name of the firm was changed to H. C. Pierce & Co. and in 1877 to Waters, Pierce & Co. The business was incorporated in 1878 as the Waters-Pierce Oil Co. under which name the business was conducted until 1913 when its name was changed to Pierce Oil Corp.

Standard Oil Co. of New Jersey owned more than 68 per cent of the Waters-Pierce stock at the time of the Standard Oil dissolution. The Rockefeller interests later disposed of its holdings to a syndicate of which Mr. Untermyer was an important member.

When dividends on the Pierce Oil Corp. preferred stock were passed, control of the corporation passed to the Untermyer interests after a spectacular fight in which Henry L. Doherty joined the Pierces to help them retain control of the corporation. This fight was lost.

In reorganizing the business the Pierce Petroleum Corp. was formed to take over the assets of the Pierce Oil Corp. Pierce Oil received the 1,103,000 plus shares for its assets.

Edward D. Levy, a railroad executive, was installed as president of the Pierce Petroleum Corp. Under his leadership the company has developed its marketing facilities in the middle west and southwest. Its outstanding development in marketing has been the building of a chain of automobile terminals and several motor tourist hotels. The terminals and hotels have been described in NATIONAL PETROLEUM NEWS.

"At the proper time it is the intention of Pierce Petroleum Corp. to distribute to its stockholders Sinclair common stock received for the business and assets of Pierce Petroleum Corp.," said Mr. Levy. When this is accomplished Pierce Oil Corp. will receive approximately 11/25ths of all Sinclair stock received by Pierce Petroleum Corp. Until this is done Pierce Oil Corp. will receive approximately 11/25ths of the dividends on the Sinclair common stock held by the Pierce Petroleum Corp."

Acquisition of the Pierce Petroleum facilities will give Sinclair distribution in southern Missouri, Oklahoma, Arkansas, Texas and Louisiana where Sinclair has had little distribution. Acquisition leaves Sinclair with only a few spots to fill in to attain intensive distribution of its products east of the Rocky mountains. It also has some distribution on the Pacific coast.

Pierce Petroleum Corp. as of Dec. 31, 1929, has total assets of $24,788,266 after deduction of depreciation reserves. It has outstanding $1,402,500 of preferred stock and 2,500,000 no par common shares which were carried on the books at $19,134,519 Dec. 31. Funded debt was $450,615 of 8 per cent debentures which, it is understood, will be assumed by Sinclair.

At the closing price of Sinclair stock May 17 Pierce Petroleum will receive approximately $18,000,000 for its business. Of this amount Pierce Oil will receive almost $8,000,000 of the Sinclair stock.

Pierce Oil has outstanding $15,000,000 of preferred stock on which dividends have accrued for more than eight years, and $29,622,831 of $25 common stock. Pierce Oil has been carrying its Pierce Petroleum investment at $34,917,817.

Shell Has $3,155,008 Loss First Quarter

CLEVELAND, May 20.—Shell Union Oil Corp. suffered a loss of $3,155,008 in the first quarter in 1930. The first quarter last year it netted $1,458,577 after interest, depletion, depreciation, and other charges except federal income taxes.

Shell Union does not state the reason for the decline in income. It has greatly increased its operating expense through its rapid expansion of marketing facilities in every state of the United States. But the entire decline in income cannot be attributed to that cause because the general trend in 1930 first quarter earnings has been downward. This is shown in most of the available first quarter reports.

Atlantic Refining Co., Colonial Beacon Oil Co., Independent Oil & Gas Co., and others, as may be seen in the appended list, have been unable to maintain the earning rate of last year.

Only two companies that have reported to date, have made gains of $500,000 or more. Those companies are the Tide Water Associated Oil Co. and the Transcontinental Oil Co.

Comparative results for first quarters of this and last year, announced to date, follows:

Company	1930	1929
Amerada	*$76,585	$50,762
American Republic	*194,875	83,788
Atlantic Refining	1,124,300	3,892,600
Barnsdall	1,420,595	1,888,372
Colonial Beacon	*856,861	140,477
Houston Oil	523,249	345,147
Independent Oil & Gas	743,195	2,018,850
Lion Oil Refining	1,714	*15,819
Louisiana Oil Refining	*63,798	239,035
Panhandle Prod. & Refg.	37,225	32,919
Rio Grande Oil	1,204,265	1,263,325
Shell Union	*3,155,008	1,458,577
Simms Petroleum	*37,554	57,351
Skelly Oil	547,510	1,170,208
Texas Pacific Coal & Oil	374,034	428,208
Tide Water Associated	2,165,387	1,613,671
Tide Water Oil	651,165	861,299
Transcontinental Oil	†1,173,869	†527,551

*Loss. †Before federal income taxes.

The Editors' Viewpoint

National Petroleum News

New Interpretation of Rebate And Discrimination Rule

THE Federal Trade Commission is leaning more towards the conservative in its ideas of the legal effectiveness of codes of marketing practices such as was adopted by the oil industry.

Just recently the commission, in revising a code drawn up by the knitted outerwear industry, redrafted the rule pertaining to rebating and price discriminations so that that rule is now virtually a restatement of the clauses of the Clayton and Sherman anti-trust laws relating to rebating.

This particular rule in the outerwear code, as adopted by that industry several months ago, read in effect that offering a rebate, or making a discrimination in price other than called for by difference in grade of goods, or in transportation or selling costs, was in itself an unfair trade practice. The oil industry's anti-rebate clause in its code also makes a rebate or price discrimination in and of itself an unfair trade practice.

The result, as adopted at the conference of the knit goods industry, read:

"Any discrimination in price between purchasers of the same class, not including discrimination in price on account of the difference in grade, quality or quantity of the product sold, or which makes only due allowance for differences in cost of selling and transportation, or discrimination in price in the same or different communities, made in good faith to meet competition, is an unfair trade practice.

"The secret payment or allowance of rebates, refunds or unearned discounts, whether in the form of money or otherwise, or secretly extending to certain purchasers special services or privileges not extended to all purchasers under like terms and conditions, is an unfair trade practice."

The rule as recently revised by the federal trade body had inserted after "competition" in the first paragraph the following limiting clause, "where the effect of such discrimination may be substantially to lessen competition or create a monopoly."

The second paragraph was amended to the same effect by the commission's writing into it after the words "like terms and conditions," the following: "with the intent and with the effect of injuring a competitor and where the effect may be to substantially lessen competition or tend to create a monopoly or to unreasonably restrain trade."

The effect of the revision is that a rebate or a price discrimination now becomes an unfair trade practice when it plainly has a tendency to put a competitor out of business and to set up a monopoly, a condition which in itself might come to the attention of the Department of Justice as a violation of the anti-trust statutes.

The mere extending of a rebate or a price discrimination is not of itself an unfair trade practice, as viewed by the Federal Trade Commission in the light of its latest pronouncement of rules of codes of marketing practices.

The oil industry's code has a clause, Rule 17 of Group 2, pertaining to rebating. It reads: "No seller shall make any deviation from his posted prices (whether wholesale or retail) by means of rebates, allowances, bonuses, concessions, benefits, unusual credits, scrip books, or any plan, device, or other scheme which may directly or indirectly permit the buyer to obtain gasoline or kerosene at a lower net cost to him."

Unquestionably the commission cannot hold to an interpretation of a code of fair trade rules for one industry which differs from similar rules for other industries. Its interpretation of the anti-rebating rule for the knitwear industry is the latest or among the latest, the commission has issued. Therefore it seems likely that the oil industry must needs consider its rule on rebating and price discrimination in the light of this new interpretation.

Cut Prices Fail To Build Gallonage

THAT it is unnecessary to give discounts on gasoline to automobile club members to build gallonage, is indicated in Washington by the gasoline tax figures.

The Independent Oil Co. of Washington allows members of the American Automobile Association 2 cents a gallon off on gasoline. The tax figures show that the Independent has only approximately 5 per cent of the total gallonage in the District of Columbia although the A. A. A. claims 26,000 members or approximately 20 per cent of the passenger vehicles registered in the district.

These percentages indicate that the Independent Oil Co. is getting only about one-fourth the business of the A. A. A. members.

Slightly more than half the gasoline business done in the district goes to the Standard Oil Co. of New Jersey and the American Oil Co. of Baltimore, the former doing about 30 per cent of the district's gallonage and the latter more than 20 per cent.

The premium grades of gasoline of these two companies are reported to be the best sellers. The Standard markets its Esso Ethyl gasoline at 3 cents premium and the American sells its benzol blend, Amoco, at 5 cents premium. The tax figures are conclusive evidence that the vast majority of automobile owners today are quality-minded rather than price-minded.

The A. A. A. does not limit its discount begging to gasoline alone. It gets 10 per cent discount on motor oil and car lubrication, tires, washing, parking, and about every other commodity or service that is used in motor car operation.

The list of stations where cut rates may be had is published monthly in a District of Columbia section of the A. A. A. official periodical. But even this buyer's guide fails to divert the A. A. A. members' purchases to the cut rate pumps in proportion to the number of members.
—R. B. S.

Review of Late Production News

AN INCREASE of 12,750 barrels in crude production in the country the past week brought daily average output to 2,607,900 barrels the week ended May 17, according to the American Petroleum Institute.

Crude oil imports were nearly 260,000 barrels daily average, compared with 166,715 barrels the previous week. Total new crude supply went to 2,867,760 barrels, an increase of 105,895 barrels over the week ended May 10.

The largest increase in individual fields was in Salt Creek. It went up 4850 barrels. Lea and Eddy counties, N. M., outside of Artesia, gained 5350 barrels.

Other larger gains were: Voshell, 4300 barrels; Earlsboro, 4200 barrels; Searight, 3350; Mission 2900; Darst Creek, 2250; Gray county, 2600 and Van Zandt 1200 barrels.

The largest decline was in Santa Fe Springs. It fell off 5500 barrels. Other decreases were: Winkler, 2600 barrels; Little River, 3200 and Allen Dome 2500 barrels.

Texas, New Mexico, Louisiana

COMPLETION of the Humble Pipeline Co.'s extension into the Hobbs, New Mexico, area brought the reopening of its Bowers permit well for a test that showed 100 barrels an hour through five-eighths inch choker at 4106 feet. The well will be exploited hereafter at a reduced rate. Atlantic Pipeline Co. is building into the Hobbs area from its West Texas facilities and Shell Pipeline Corp., is expected to begin construction soon.

In the Howard-Glasscock area of West Texas a maximum limit of 200 barrels per well daily was agreed on at a prorating meeting held in Fort Worth, because of reduced market outlets.

Gulf Production Co.'s A-1 Dix-McKean, 1000 feet from the Magnolia Petroleum Co.'s big well in the Darst Creek field, Luling fault zone, tested at the rate of 22,000 barrels daily in the Austin chalk formation at 2223 feet. It is in a field prorated at approximately 23,000 barrel daily market outlet.

In the Shreveport district, the Standard Oil Co. of Louisiana has taken over 6370 acres of leaseholds previously owned by R. O. Roy in the Holly district, where a 3000-barrel discovery well was drilled several months ago. A consideration of $1,000,000 cash and a similar amount out of one-fourth of the first oil produced is reported.

Current production in this country by pools is found on page 121.

Oklahoma-Kansas

THOUGH rain slowed up activities in the Mid-Continent during the past week there were some interesting developments in a number of places.

The new South Earlsboro pool of Seminole county Okla. had the second largest well that has ever been brought in in the Greater Seminole district. Oklahoma City had two wildcat failures on the northeast of the big producing area but there were 17 good completions in the heart of the field that had average initials of over 8,000 barrels.

In Kansas, the Raymond pool of Rice county is to be opened up to the limit of the marketing facilities instead of holding the five producers to 50 barrels a day. The pool has a potential of over 5000 barrels and is a Siliceous lime area. It is one that will bear watching in the future as more wells are drilled. The Voshell pool in McPherson county was moved north one location and a good Simpson showing was found in a wildcat of Reno county.

California

A CUT in the offered price of Santa Fe Springs crude oil by Standard Oil Co. of California constituted the most important development in the California picture during the week.

This action was taken following the failure of seven operators in this field to join other California operators in their effort to reduce daily crude oil production for the state to the estimated demand 609,000 barrels.

Of secondary importance to the western oil industry and in sharp contrast to this evident reluctance of some individuals to cooperate, was the announcement that a new allowable of 596,000 barrels had been set for the state during the balance of 1930.

Introduction of the human element into the Pacific coast situation is expected to prevent the attainment of this figure for at least several months, but leading conservationists will be satisfied if actual daily output for the state is reduced to 610,000 barrels. Average daily production during week ended May 17 was estimated at 631,700 barrels, a decrease of 3400 barrels under the previous week.

Development and production activities during the week were confined principally to areas in the Los Angeles Basin, field, particularly in the fields of Playa del Rey and Potrero.

Wyoming, Montana

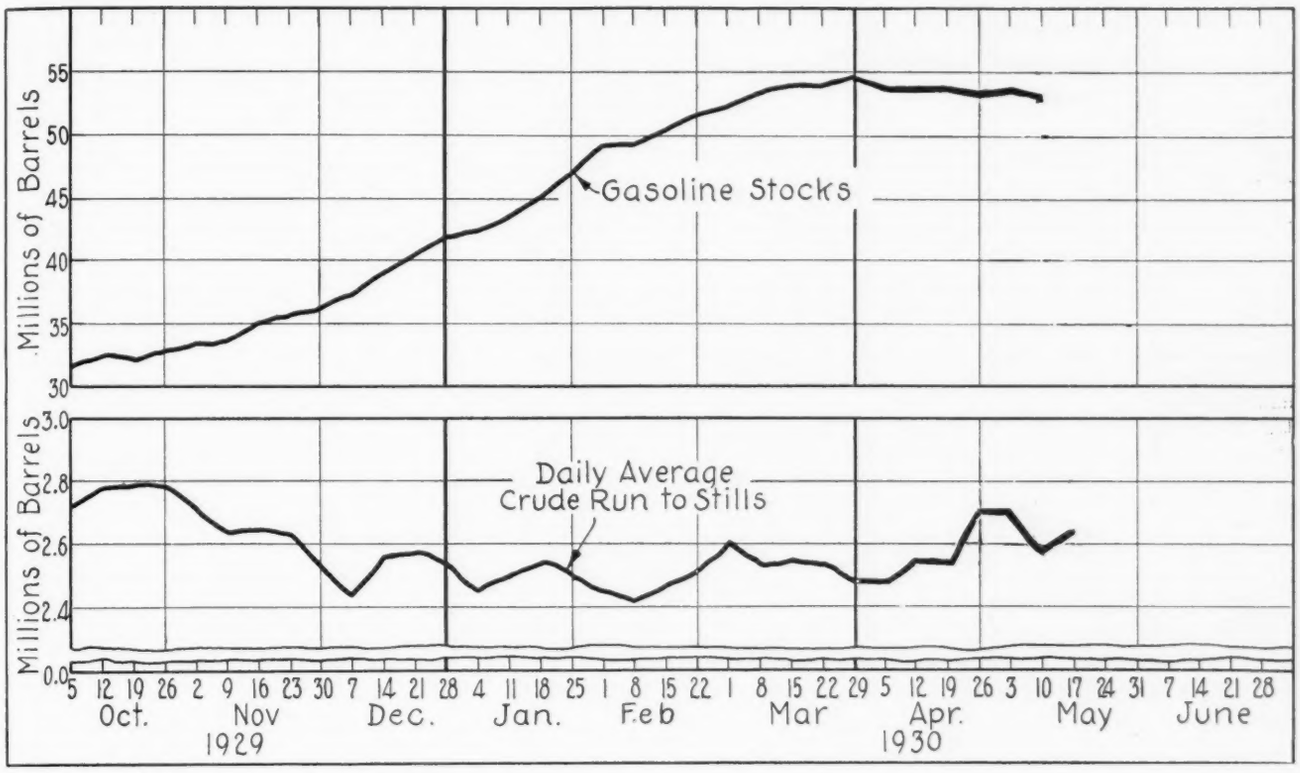
THERE are 20 wells either drilling or rigging up in the new Montana-Alberta oil field across the international boundary. The next new field to be discovered in the state will be, it is believed, at the Bear's Den district in the Sweetgrass hills. A discovery of sorts was made on this structure last summer, and the present test is checking much higher and has a 5,000,000 cubic feet gas flow.

In Wyoming several deep tests are resuming this month. One is the Argo Oil Co.'s in the Mule Creek field in eastern Wyoming. This well was started early last year and found water in the Sundance.

In the Osage field, eastern Wyoming, where discoveries have been important recently in a west extension, an Ohio company is reported to have paid $36,000 for a 40-acre tract to Julius Bok.

Midwest Refining Co. has resumed spudding in its deep test well on Midway dome, following a temporary shutdown. In the Salt Creek field the deep test to the granite is showing oil in the Madison lime which has just been topped. It is also showing considerable water which is to be cased off.

U. S. Crude Runs and Gasoline Stocks as Reported Weekly by A. P. I.



Refining Operations Almost in Balance

By Telegraph
NEW YORK, May 20

REFINING operations in the United States were nearly in balance during the week ended May 17 according to reports gathered by the American Petroleum Institute. Gasoline stocks increased only 117,000 barrels and fuel oil stocks increased only 55,000 barrels.

Crude runs to stills by all reporting plants were reduced 14,600 barrels daily average to 2,645,700 barrels which represented 75.2 per cent of capacity. In the previous week refiners utilized 75.7 per cent of their operating capacity.

There was no uniformity in the trend of operations among the various refining groups. Cuts in runs were made by Indiana-Illinois and California refiners, the former cutting 18,100 barrels daily average and the latter 15,000 barrels daily average. East and Gulf coast plants reported minor cuts in crude runs while other groups made small increases.

A sharp decline in demand for California gasoline was indicated by the report. In spite of the cut of 15,000 barrels per day in runs to 64.9 per cent of capacity, California gasoline stocks increased 256,000 barrels, more than double the increase for the nation as a whole. East coast stocks were reduced 156,000 barrels while Gulf coast stocks as a whole showed little change.

Current Refinery Operations

Districts	Per Cent Capacity Reporting	Daily Average Crude to Stills (Barrels) Week Ended		Per Cent of Reporting Capacity Operated Week Ended		Stocks (Thousands of Barrels)			
		May 17	May 10	May 17	May 10	Gasoline May 17	Gasoline May 10	Gas & Fuel Oil May 17	Gas & Fuel Oil May 10
East Coast	100.0	470,600	475,300	77.7	78.5	9,090	9,246	7,048	6,906
Appalachian	89.1	95,000	91,600	83.3	80.3	1,783	1,788	823	760
Ind., Ill., Ky.	99.5	316,700	334,800	84.2	89.0	8,513	8,553	3,426	3,751
Okla., Kans., Mo.	89.8	311,400	303,900	75.0	73.8	4,536	4,455	4,164	4,183
Texas	90.8	635,300	630,400	88.8	88.1	7,940	7,942	10,482	10,132
La., Ark.	96.8	174,000	171,300	66.4	65.4	2,541	2,615	1,878	1,985
Rocky Mountain	93.6	64,000	59,300	45.9	42.6	2,800	2,743	1,102	1,083
California	99.3	578,700	593,700	64.9	66.6	16,117	15,861	108,081	108,149
Total	95.7	2,645,700	2,660,300	75.2	75.7	53,320	53,203	137,004	136,949
Texas (Gulf Coast)	100.0	474,000	478,600	90.0	90.9	6,814	6,725	7,678	7,413
La. (Gulf Coast)	100.0	119,100	117,400	80.7	79.6	2,149	2,221	1,014	1,111

A. P. I. Approves Research Projects for 1930-31

NEW YORK, May 19.—The American Petroleum Institute will begin its last year of fundamental research into oil problems through university and government laboratories on July 1. Twenty projects have been approved by institute directors for the year.

The research program has been financed by gifts totaling $500,000 offered by John D. Rockefeller and the Universal Oil Products Co. The fund has been spent at the rate of $100,000 per year for the past four years, results of the studies being published in the technical journals and summarized in the institute bulletin.

Following are the projects and directors for the coming year:

Fundamental Research Program
July 1, 1930—June 30, 1931

Project Number — **Title**

1. Generation of Oil in Rocks by Shearing Pressures. Director: Prof. Warren J. Mead, University of Wisconsin, Madison, Wis.

2. Action of Oxygen (and Air) on Cyclopentane and Cyclohexane Hydrocarbons with Side Chains. Director Dr. Georges Chavanne, University of Brussels, Brussels, Belgium.

3. Studies of Source Rocks in the Micro-Furnace. Director: Dr. David White, U. S. Geological Survey, Washington, D. C.

4. Origin and Environment of Source Sediments Present in Petroleum. Director and Research Associate: Parker D. Trask, Princeton University, Princeton, N. J.

6. The Separation, Identification and Determination of the Chemical Constituents of Commercial Petroleum Fractions. Director: Dr. E. W. Washburn, Bureau of Standards, Washington, D. C.

7. Catalytic Methods Applied to Petroleum Hydrocarbons. Director: Dr. Hugh S. Taylor, Princeton University, Princeton, N. J.

8. The Effect of Electrical Discharge Upon Gaseous Hydrocarbons. Director: Dr. Samuel C. Lind, University of Minnesota, Minneapolis, Minn.

18. Non-Catalytic Thermal Decomposition of Pure Hydrocarbons and Related Compounds. Director: Dr. Charles D. Hurd, Northwestern University, Evanston, Ill.

19. A study of the Relative Rates of Reaction of the Olefins. Director and Research Associate: Dr. Harold S. Davis, Massachusetts Institute of Technology, Cambridge, Mass.

20. Isolation and Investigation of Nitrogen Compounds Present in Petroleum. Director: Dr. J. R. Bailey, University of Texas, Austin, Tex.

23. Limestones and Dolomites as Reservoir Rocks. Director: Dr. A. H. Daniels, University of Illinois, Urbana, Ill.

25. Determination of Geothermal Gradients in Oil Fields on Anticlinal Structure. Part A.—Oklahoma. Director: Dr. C. N. Gould, University of Oklahoma, Norman, Okla.

Part B.—Texas. Director: Dr. F. B. Plummer, University of Texas, Austin, Tex.

Part C.—California. Director: Prof. Lester C. Uren, University of California, Berkeley, Calif.

28. A study of the Reactions of a Number of Selected Organic Sulfur Compounds. Director: Dr. E. Emmet Reid, Johns Hopkins University, Baltimore, Md.

29. An Investigation of the Heat Capacities and Free Energies of Some Typical Hydrocarbon Compounds. Director: Dr. George S. Parks, Stanford University, Stanford University, Calif.

32. Equation of State of Certain Easily Liquefiable Hydrocarbons. Director: Dr. Jean Timmermans, University of Brussels, Brussels, Belgium.

36. The Fundamentals of the Retention of Oil by Sand. Measurements on the Mobility of Suspensions in rotating Electric Fields. Director: Dr. Robert A. Millikan, California Institute of Technology, Pasadena, Calif.

37. The Fundamentals of the Retention of Oil by Sand. Fundamental Factors in removal of Petroleum from the Sands. Director: Dr. Robert A. Millikan, California Institute of Technology, Pasadena, Calif.

38. Thermodynamic Properties of Petroleum Hydrocarbons. Directors: Dr. C. S. Cragoe and Dr. H. C. Dickinson, Bureau of Standards, Washington, D. C.

40. Specific Absorbents for Sulfur Compounds in Petroleum. Director: Dr. H. S. Taylor, Princeton University, Princeton, N. J.

41. The Preparation and Properties of Thiophanes. Director: Dr. R. W. Bost, The University of North Carolina, Chapel Hill, N. C.

Joe Walsh Joins Jesco Lubricants Co.

KANSAS CITY, May 13.—Joe L. Walsh has resigned the presidency of the Home Oil & Supply Co., Denver, to become director of sales of the Jesco Lubricants Co., of this city, which is engaged primarily in the manufacture of lead base gear lubricants for both automotive and industrial uses.

The experience of Mr. Walsh in the oil business goes back 25 years to a start in Cleveland. He has been with several of the larger companies and was formerly a director of the Western Petroleum Refiners Association. J. A. Edwards is president of the Jesco Lubricants Co.

J. L. Walsh

Oil Purchasing Agents to Meet

CLEVELAND, May 19.—Uniform marking of valves and fittings will be considered by the oil company buyers group of the National Association of Purchasing Agents at the fifteenth annual convention to be held at the Hotel Stevens, Chicago, June 16-19.

The oil group will hold two meetings. The first will follow a dinner at 6 p. m., June 16 and the second will be at 9 a. m., June 18. H. D. Patridge of the Indian Territory Illuminating Oil Co., is chairman of the oil group.

Crew Levick to Enlarge Titusville Refinery

TULSA, May 17.—A three hundred thousand dollar expansion program is outlined for the Titusville refinery of the Crew Levick Co. Cities Service subsidiary, it has been announced.

The installation of two large Foster and Wheeler distillation units will be an important feature in the enlargement of the plant. The throughput capacity of the plant will be increased from 3000 barrels daily to some 6000 barrels per day. Work on the tankage for charging stock and finished prod-

uct will be carried on simultaneously with the erection of the distillation units.

The refinery is located on 50 acres of land in the city of Titusville. Thirty acres of the tract was purchased about a year ago in preparation of the expansion program.

Improvements are also being made in the marketing division of the company in Titusville. This division was established with the purchase of the Towco Filling Stations and the Consolidated Filling Station Co. last fall.

New England Jobbers Told Of Anti-Freeze Product

NEW YORK, May 19.—The second of the monthly summer meetings of the Independent Oil Men's Association of New England, was held May 13 at the Unicorn Country Club, Stoneham, Mass. All future meetings during the summer will be held the second Wednesday of each month, W. C. O'Meara, president, said.

W. H. Reinhart, of the Du Pont Ammonia Corp. of West Virginia, was a guest at the invitation of A. A. Harrison, Borden Remington Co., Fall River, Mass. Mr. Reinhart discussed methanol, an anti-freeze liquid manufactured by the Du Pont company.

The next meeting, to be held June 11, will be under the auspices of June Richdale, Colonial Beacon Oil Co., Boston. It will be at a country club in Middletown, Conn. A record attendance is being looked for, particularly since Middletown is close for both New York and Rhode Island jobbers.

A feature of this meeting will be the start of the golf competition to which the Richfield Oil Corp. has added impetus by the promise of a golf trophy to the winner. Each low scorer over 18 holes at the meetings in June, July, August and September will be eligible to compete in the finals some time in October over a 36-hole course.

Alabama Jobbers to Meet Three Times in Year

BIRMINGHAM, May 15.—Alabama oil jobbers and marketers who organized the Alabama Oil Men's Association in May, have invited refiners and equipment manufacturers to become associate members.

Officers are: J. Gregory Johnston, General Oil Corp., Birmingham, president; J. W. McCown Oil Co., Mobile, vice president; S. H. Arnold, of the Alabama Oil Co., doing business at Decatur, Gadsden, Hollywood and Huntsville, vice president; and U. M. Bachtel, White Oil Co., Tuscaloosa vice president. Mr. Arnold is also head of the Elk Oil Co., Fayetteville, Tenn., according to S. C. Klein, executive secretary of the association.

There will be at least three general meetings a year, two regional meetings in the southern part of the state and two in the northern, Mr. Klein says. Mr. McCown will preside at the meetings in the south and Mr. Arnold over those in the north.

No other oil association is now active in Alabama.

Virginia Oil Men Condemn All Commercial Discounts

By E. L. Barringer
N. P. N. STAFF WRITER

ROANOKE, Va., May 15

ALL commercial discounts were condemned by the Virginia Oil Men's Association in a resolution unanimously adopted at the spring convention here May 14 and 15.

Commercial discounts granted in the big cities in the eastern states have been affecting marketing conditions in Virginia. Discounts are given commercial trucks at service stations, and are extended by some companies to salesmen's cars bearing pleasure car licenses.

Discussion of commercial discounts took up most of the time at the code of ethics session. Paul E. Hadlick, secretary of the marketing division of the American Petroleum Institute, presided after addressing the convention on the workings of the code.

Several jobbers told the convention of their experience with the commercial discount at service stations.

"We cut out commercial discounts at stations in December 1928 and now we sell more gasoline than ever in spite of one less stations," said W. C. Hilderman, of Automotive Service Corp., Danville.

"A nigger paying cash for his gasoline for an old, broken down auto is a better customer than the big truck wanting a discount and credit," a jobber shouted from the floor.

"I have had only one commercial discount at my station and I'm no better business man than any of you other men," said P. P. Hunter, operator of the Elmwood station in Roanoke. "I have been here for six years and have seen many jobbers come and ago."

The resolution condemning all commercial discounts was offered by Mr. Hilderman. It was adopted unanimously.

The convention was opened in the afternoon of May 14 with an address of welcome by Mayor Charles D. Fox of Roanoke. McCall Frazier, commissioner of motor vehicles, was the first speaker, followed by Mr. Hadlick and the code discussion.

Determination of a proper shrinkage allowance on payment of the state gasoline tax was suggested by Mr. Frazier through a committee of oil men conferring with his office. He reported that a check of statistics in his office showed the average shrinkage was 1½ per cent.

Jobbers were warned by Mr. Frazier that an allowance for shrinkage should be reflected in a corresponding lowering of the price to the consumer.

The banquet was on the first evening with addresses by Mayor Fox and David A. Jayne, humorist.

About 20 oil men participated in the golf tournament on the morning of May 15. In the afternoon Capt. W. M. Stryker, The Texas Co., addressed the convention on aviation and the oil industry.

In the election of officers Paul P. Hunter, Roanoke, was selected as president; Abe Rubin, Charlottesville, first vice-president; Fred W. Rade, Rosslyn, second vice-president; and P. S. Ford, Martinsville, third vice-president.

J. Gregory Johnston
first president of the newly organized Alabama Oil Men's Association

Bradford, Pa., Operators Cut Production 20 Per Cent

By Telephone

BRADFORD, Pa., May 20

PRODUCERS representing 25,000 barrels of the 32,000 barrels daily average production in the McKean County, Pa., field have asserted they will cut their production to 80 per cent of their April output.

This action is the result of opinions expressed at meetings of the Northwestern Pennsylvania Oil Producers Association that this percentage curtailment would be the best method of keeping down overproduction in that rejuvenated Pennsylvania area.

The 80 per cent curtailment proposition followed a 36-hour shutdown from 6 p. m. May 17 to 6 a. m. May 19. The shutdown did not work equitably particularly because of the differences in flooding methods.

A meeting of a special committee of the association was called May 19 by A. E. Booth, the association's president, when opinion was generally expressed that the 80 per cent curtailment proposal made when the association met last week to consider overproduction, would attain the ends desired. Operators at the May 19 meeting approved a proposal to make the 80 per cent curtailment effective as of May 16 and to continue it to July 1.

A meeting of the New York State Oil Producers Association will be held May 21 at Bolivar, N. Y., at the call of President Lewis H. Thornton, to consider plans for an 80 per cent curtailment of the Allegany, County, N. Y. production which averaged 10,000 barrels daily in April. New York producers visited Bradford May 20 to discuss details of the Bradford plan. Most New York operators have already said they would cut 20 per cent, it is reported.

Action to curtail production has been spurred by the two 25-cent price cuts in Bradford crude oil this month. The second cut came May 16 after the overproduction problem had been considered by the Pennsylvania association.

Price of Bradford grade crude is now $2.50 a barrel at the well. This price is 25 cents a barrel over the posted price of the Joseph Seep Purchasing agency of the South Penn Oil Co. The Bradford district market is really set by the Bradford Transit Co., which was formed last fall by the Tide Water Oil Co. and the South Penn Oil Co. Pipe lines of these two companies and the Emery Pipe Line Co. went into the Bradford Transit system.

Other pipe line systems in McKean county include those of the Forest Oil Co., Vacuum Oil Co., United Refining Co., Kendall Refining Co., and McKean County Oil Refining Co. National Transit Co. gathers only a little Bradford crude.

In Allegany county there are the systems of the New York Transit Co., and the Sinclair Refining Co. and Vacuum Oil Co.

S.O. New Jersey Profits Exceed Those of 1928

CLEVELAND, May 19.—Standard Oil Co. (N. J.) and affiliated companies netted $120,912,148 in 1929 compared with $108,485,686 in 1928. Earnings were $4.75 on 25,418,968 $25 shares in 1929 and $4.43 on 24,484,219 shares in 1928.

The 1929 earnings were equivalent to 10.2 per cent on the net assets which amounted Dec. 31 to $1,184,697,419.

More detailed figures on the New Jersey company's operations with comments of W. C. Teagle, president, will be carried in a later issue of NATIONAL PETROLEUM NEWS.

Cities Service Rights Worth $37,000,000

CLEVELAND, May 19.—Stock conversion rights estimated at current market prices to be worth more than $37,000,000 were attached to the $120,000,000 of 5 per cent convertible debentures issued last week by Cities Service Co.

Subscription rights to subscribe to the debentures are being issued to Cities Service stockholders at $4 principal amount of debenture for each common share held of May 29 record.

The debentures are convertible into Cities Service common stock at 27½ a share from Dec. 1, 1930, to June 1, 1931, and at $1.25 a share more each six months until June 2, 1935, when the conversion price will be $38.75 a share. Conversion privilege expires Dec. 1, 1935.

Debentures, when issued, are to contain an indenture to protect the conversion privilege against dilution.

Subscription rights are transferable so stockholders may buy or sell rights sufficient to purchase an even amount of the debentures. Denominations are $100, $500, and $1000.

The debentures mature in 1950. The issue has been underwritten by a syndicate headed by Harris, Forbes & Co., Halsey, Stuart & Co. and the Harris Trust & Savings Co.

Another Well Goes Wild At Oklahoma City

BARTLESVILLE, May 17.—Phillips Petroleum Co. et al brought in May 16 their Sigmon No. 1 as a wild well, a half mile east of the famous Mary Sudik of the Indian Territory Illuminating Oil Co. which resisted efforts to shut it in for 11 days. The Sigmon made such large quantities of sand that operators were unable to close the two massive master gates when the well blew in. Efforts to close the gates were rewarded also by the bursting of the six-inch casing between the two gates.

Company efforts now are centered on replacing the gates and split casing in the face of an enormous gas pressure, estimated at 2000 pounds per square inch. If this cannot be done it will be necessary to resort to the methods successfully used on the Mary Sudik. Operations within a mile of the well have been suspended.

New Wells in Voshell Pool

By Telegraph

TULSA, May 20.—Three new wells were added to the list of producers in the Voshell pool May 20. Two of them in Sec. 4-21S-3W and one in Sec. 9 of the same township. There were equally divided between the Wilcox and Siliceous producing horizons. The best of the lot was the Derby Oil Co.'s No. 4 in the NW SE of 9-21S-3W which is swabbing 85 barrels an hour from the siliceous lime at 3373-3383.

RICHMOND, Va., May 20.—Properties of the Virginia-Carolina Gas & Oil Co., successor to the Harris Oil Co., Martinsville, Va., have been purchased by the Continental Oil Co., Ponca City, Okla. The purchase includes storage tanks and other property at the Fieldale station, and some 20 service stations throughout Henry county. John G. Prevette, manager of the Virginia company the past year, is being retained to have charge of the Martinsville business of the company.

The smallest imports of the United States are lubricating and paraffin oils. During February 1101 barrels of this product was imported, some coming from Germany, France, Belgium and Canada.

Failure to Agree on Proration Causes Santa Fe Springs Crude Cut

CLEVELAND, May 19

SANTA FE SPRINGS crude prices were cut 42 to 95 cents per barrel May 17. The day previous Pennsylvania grade crudes were reduced 25 cents per barrel. This was the second cut in Pennsylvania crudes this month.

The action of crude oil purchasers in these two cases is a clear indication of the state of mind of major crude buyers throughout the country. It is apparent that the buyers now see no economic justification in paying producers for crude which they cannot dispose of promptly.

In the Pennsylvania fields production has been mounting steadily as flooding methods have been perfected. Drilling operations have approximated those of the flush days of 1880 and production has climbed almost back to the level obtained at the peak established then. Current production of about 76,000 barrels per day is only some 12,000 barrels below the record reached 50 years ago.

Recent crude cuts in Pennsylvania have centered the attention of producers there on the fact that oil is valued for its lubricating content and that the demand is more limited than that for the crudes valued more for gasoline yield. Indications are that the producers will begin considering methods of curbing output in line with current demand.

The Santa Fe Springs cut followed within one day the inability of operators in that field to agree on an extension of proration.

By Jack N. Westsmith
N. P. N. Staff Writer

LOS ANGELES, May 17

SEVEN independent operators called the hand of California conservationists by refusing to join with other operators in the field in curtailing their daily crude output to the desired figure of 104,716 barrels.

The attitude of these antagonistic operators was presented before the General Committee of Fifteen, May 14 and discussed at a later meeting of leaders of the Pacific Coast oil industry May 16, with the end in view of preventing a threatened reduction in the crude oil price structure.

These meetings were to no avail, however, and Standard Oil Co. of California announced a reduction of from 42 to 95 cents in the offered price on Santa Fe Springs crude, effective at 7 o'clock May 17. The following statement accompanied the announcement:

"Conditions in Santa Fe Springs do not justify offering of prices that will encourage overproduction. The operators of Santa Fe Springs today failed to agree on the conservation program which has been accepted by operators in all other California fields.

"This failure to agree places in jeopardy the entire conservation movement in California. No change has been made in prices offered by Standard for oil in other fields of California. Standard is maintaining its established policy of currently offering producers such prices for crude as conditions warrant."

Paul Boggs, chairman of the General Committee of 15 California operators, formed to direct a statewide curtailment program, stated at a meeting May 16 that the committee would hold no other meetings to discuss ways and means of forcing operators to accept the curtailment program. This announcement was made following reports by Hooper Dunbar, chairman of Santa Fe Springs operators' committee and A. T. Jergins holding a similar position in the Signal Hill field.

Mr. Dunbar reported that while a large majority of operators at "the Springs" favored a continuation of the curtailment program, it had been impossible to obtain 100 per cent cooperation because of the refusal of two large independents, Wilshire Oil Group and George F. Getty Inc., to join the movement. Paul Getty announced that he was willing to reduce his daily output at Santa Fe Springs provided the movement could be made 100 per cent—100 per cent of all operators with exception of Wilshire Group and Mohawk Oil Co., who have consistently refused to entertain the idea of production curtailment.

Oscar Howard, and the McKeon Oil Co., two small independent operators with potential productions of 1055 and 757 barrels per day respectively, threw the finishing monkey wrench into the conservation machinery by refusing to join any curtailment movement. Major interests refused to continue absorbing excess production, brought above ground by the group of independents, as a means of keeping the field within reach of its allotted daily output, and the result was fulfillment of the predicted cut in crude.

Mr. Jergins announced that all but three of the 30 Signal Hill operators who had previously held out against a continuation of proration efforts in that field had signed up to continue for another three-month period. The cooperative action in the Long Beach field prevented a downward revision of the crude oil price structure that would have been similar in nature to the reduction at Santa Fe Springs.

This adverse reaction to the conservation movement followed immediately upon an announcement by the General Committee on state wide proration to the effect that California's daily allowable production had been set at 596,000 barrels for the balance of 1930, a reduction of 36,700 barrels under the actual daily production for week ended May 17.

The committee acting on a report submitted to it by the Fact Finding Committee and the Oil Research Committee, announced California's estimated potential production for May was 1,107,050 barrels per day, a new peak potential output and approximately 26,000 barrels above the April potential of 1,081,383 barrels. Of this total possible daily yield, 659,100 barrels is from fields classed as in flush production, 379,950 from fields in settled production, and 68,000 barrels from the Kettleman Hills area, in controlled production. The large amount of potential production held by operators in the flush areas has made it extremely difficult to achieve an equitable and yet effective plan of production curtailment, as producers in the fields having settled production could see no reason why they should bear the entire brunt of the reduction and the remaining producers thought it uneconomical for any of this heavy oil to be produced while a condition of overproduction exists.

Production by fields throughout the

California Potential Production Compared with Allowable and Actual Output as of May 15

Group I	Potential Prod.	Per Cent Cut	Allowable	Actual
Santa Fe Springs	196,000	46.25	104,716	128,304
Long Beach	166,200	46.25	89,333	99,295
Ventura	87,700	46.25	47,139	52,035
Elwood	93,000	46.25	49,988	44,117
Seal Beach (Alamitos)	37,900	46.25	20,371	24,127
Kern Front	22,500	46.25	12,094	11,773
Mt. Poso	22,300	46.25	11,986	10,221
Round Mountain	11,500	46.25	6,181	4,776
Maricopa	22,000	46.25	11,825	13,426
Total Group I	659,100	46.25	354,267	388,077
Group 2				
Settled fields	379,950	40.1	227,592	226,184
Group 3				
Kettleman Hills	68,000	79.2	14,144	14,550
GRAND TOTAL	1,107,050	46.1	596,003	628,761

state is contained in the accompanying table showing the potential production as of May 15, the percentage this production is to be curtailed to arrive at, the allowable production, and the actual production as of May 12.

The new allowable production for California fields was agreed upon as a compromise between various factions, one of which proposed a figure of 575,000 barrels and another that was in favor of keeping the allowable at its previous figure of 609,000 barrels.

Actual production for the state during the past month has been consistently about 630,000 barrels or an excess of about 21,000 barrels. By setting the new allowable at 596,000 barrels per day it is the hope of California oil leaders to reduce the actual output at least to the 609,000 barrels, ascertained to be the average daily consumption of California markets. Any reduction below this figure will permit a reduction in the overloaded storage capacities on the west coast.

It had been hoped California's gas conservation law would act as a stabilizer on the local production problem, but unfavorable developments in the Santa Fe Springs case, occasioned by successful court action by the Wilshire Oil Group and a smaller group of independents, and adverse rulings by the Superior Judge in the Long Beach hearing has prevented this statute from becoming the anticipated boon to the oil industry.

During the past week, state officials, in presenting their evidence before Superior Judge Crawford at Long Beach in proof of an existing gas wastage, received one of the most serious set-backs yet encountered in their enforcement of the "gas law." The court decreed that privileged records of the State Mining Bureau could not be introduced by the state to support its claims.

Defense attorneys claimed, the law creating the State Mining Bureau, maintained by assessments against oil operators, provided that records submitted by the oil companies on their operations throughout the state should be kept confidential, and the court sustained this claim.

Judge Crawford also ruled that the state could not subpoena operators in the field to bring into court their past production records although he intimated that this action might be necessary at some time during the course of the trial.

Whether or not the anti-waste gas law eventually becomes an important part of California's conservation machinery, following its passage through the State Supreme Court, Pacific Operators will have to look elsewhere for a remedy for the present overproduction problem.

The wording of Standard Oil Co.'s announcement of the crude oil price cut at Santa Fe Springs was taken by some operators to indicate that the price schedule would be returned to its former level as soon as production was reduced to the allowable figure.

New Standardization Committee Heads

CLEVELAND, May 19.—G. O. Wilson of the Standard Oil Co. of California, has been made national chairman of the American Petroleum Institute committee on standardization of steel tanks for oil storage. He formerly was vice chairman. Mark W. Daw, Shell Oil Co., San Francisco is secretary.

John R. Suman of the Humble Oil & Refining Co., Houston, has been made chairman of the standardization committee on oil country tubular goods. Melbert Schwartz of the Rio-Bravo Oil Co., Houston, has been named secretary of the committee. Two new sub committees are to be named soon, one on line pipe and the other on casing, drill pipe and tubing standards.

WASHINGTON—Scott Turner, director of the U. S. Bureau of Mines, delivered the graduating day address at the Colorado School of Mines at Golden, Col., May 16.

Natural Gasoline Association Meeting Opens at Tulsa

By Telegraph
TULSA, May 30

WITH an early registration of over 200 the ninth annual convention of the Natural Gasoline Association of America opened at Tulsa May 20 with Frank L. Chase of the Lone Star Gas Co., Dallas, presiding. In his welcoming address Mr. Chase complimented the members of the association on the interest in the work and the natural gasoline industry shown by the employes of the member companies. The growth of the industry, he said, was largely due to the interchange of ideas between the men engaged in it. The convention meetings he said were one of the best places to solve the many problems still confronting the industry. He urged those present to discuss any new ideas they might have developed during the past year.

The president's address was then read by Dr. E. R. Lederer, president of the association. Dr. Lederer's paper is printed elsewhere in this issue.

The remainder of the morning sessions was occupied with the report of special committees and the introduction by R. C. Wheeler of the General Petroleum Corp., of a group of delegates to the convention from California. T. R. Goebel of the Skelly Oil Co., reported on the work done by the gas contract which has been passed on by both the operating and legal departments of many of the member companies is now before the board of directors of the association for final approval. Every effort he said has been made to make the contract one that would be mutually agreeable to buyer and seller. Other committees to report were the sales managers committee headed by M. E. Foster, Phillips Petroleum Co., and the publicity committee under Emby Kaye, of the Skelly Oil Co.

Mr. Foster said that the efforts of the sales managers had been directed toward a stabilization of the price, doing away with the extreme price fluctuations which once made the industry engaged in either a feast or a famine. He pointed out that the natural gasoline industry has come to realize that it cannot expect much difference in the price it receives for its product and the price of U. S. Motor Gasoline. Development of new markets was urged as an outlet for the increased production of natural gasoline that the committee foresaw in the future.

Emby Kaye expressed the appreciation of the publicity committee for the space devoted to the natural gasoline industry in the oil trade papers.

Natural Gasoline Industry in Equilibrium Despite 28% Output Increase in 1929

By Dr. E. R. Lederer*

(Presented before Natural Gasoline Association of America, Tulsa, May 20-22)

WE CAN review the past year with a feeling of satisfaction, which honest and conscientious service and work always leaves with us. Although we might not be able to show any spectacular results for our efforts, we know that we have kept up the prestige of our association as a serious-minded working body and we trust we have laid the foundation for some developments which will benefit our industry in the future.

Our industry is closely interconnected with the producing and refining branches of the oil industry; we share with them in feast or famine.

We serve not only the oil industry but the whole country by conserving valuable and necessary hydrocarbons from casinghead gas which otherwise would go to waste and would not find the utilization as valuable motor fuel we afford to natural gasoline and also to residue gas for industrial and domestic fuel.

Realizing that our industry can survive and take its proper place in the realm of industrial life only, if it is placed on a scientific and efficient base, a group of farsighted members of our association prevailed in June, 1926, on the board of directors to appoint an educational committee.

Its duty was to familiarize the buyers of our product and the public in general with the intrinsic value and qualities of natural gasoline and propagate its usefulness.

This work, under the skilful direction of Dr. G. G. Brown of the University of Michigan, developed into a scope of real magnitude and its results are today common knowledge of everybody connected with or interested in the manufacture of motor fuel. To undertake and carry out such a scientific program over four years, involving a cash expenditure of seventy thousand dollars, besides the sacrifice of valuable time on the part of a good many member companies, is a true indication of the splendid spirit pervading this association.

Dr. Brown has presented to you in his interesting and illuminating manner during the last three annual conventions the progress of his work.

We are happy to present to you and to the entire natural gasoline and refining industry, during this year's convention, a book containing the summary of all this work.

We owe an expression of gratitude to Dr. Brown and also to the University of Michigan, which co-operated with us in issuing this book, which will be a welcome and very useful addition to every technical library and of immense value to all those interested in the manufacture of natural and refined gasoline and motor fuels.

The Educational Committee, with G. G. Oberfell as chairman, in co-operation with Dr. Brown is conducting at present, an investigation of aviation fuels with particular reference to vapor-lock.

Several member companies, Phillips Petroleum, Empire Oil and Refining, Skelly Oil and Shell Petroleum, have volunteered the services of their aeroplanes, pilots and technologists, have equipped their ships with special instruments and a series of specified tests are carried out now with different types of motors, motor fuels, and under varying conditions. It will be some time before dependable results will be obtained, which can be summarized and published, but we can expect some very interesting and beneficial information from this work.

The changes in compression ratio, the tendency towards high speed motors, new types of aeroplane engines require different motor fuels than we used to produce.

Governmental agencies insisted on new specifications, standardizing the various types of motor fuels offered on the market for their purchasing agencies. The manufacturers of motor fuels had to get together in self-defense and discuss such new specifications with the government's technologists or see their industries burdened with specifications which might cause economic losses in operation.

Possibly this exigency helped us accomplish, during the past year, one of our aims—that of closer personal contact and co-operation with the refiners.

The Natural Gasoline Association anticipated the need for new motor fuel specifications. We knew that the last revision of July, 1928 was only a temporary expedient, more a guide for the sales manager or buyer to go by, than for the technologist, who blends gasoline scientifically for use as motor fuel.

As early as February 1929 the Specifications Committee referred to the Technical Committee, the problem of revision of volatility specifications for the standard grades of natural gasoline. This problem was referred to a sub-committee with G. M. Davidson of the Empire Oil and Refining Co. as chairman, and R. C. Alden of Phillips Petroleum Co., R. E. Baker of Shell Petroleum Corp. and R. L. Gallagher of Sinclair Oil and Gas Co. as active members.

These men did some real work. They gathered in the laboratory of the Phillips Petroleum Co. at Burbank for weeks at a time, neglecting their individual work for their employers, until they were satisfied and had all the proofs that the new proposed specifications were the ones our industry needed and the refiners could go by to intelligently blend both products to-

Highlights in President's Annual Address

THE natural gasoline industry welcomes the proration efforts of crude oil producers despite the fact that such programs cut deeply in natural gasoline output. The industry realizes that its prosperity depends on the refinery gasoline market which in turn depends on crude production.

Unless there is an unexpected flood of natural gasoline from some source the industry should remain in a sound position this year. Last year increased demand for natural gasoline enabled the industry to remain in equilibrium despite a 28 per cent increase in output while motor fuel demand was increasing only about 13 per cent.

*President of the Natural Gasoline Association of America and Vice President of the Texas Pacific Coal & Oil Co., Fort Worth.

gether and produce the motor fuel of tomorrow.

They submitted to your board of directors on Aug. 1, 1929 a "Proposed Revision of Natural Gasoline Specifications" which represent a mass of scientific data, new revelations in the investigation of volatility and vapor pressure, and which I consider a masterpiece, regardless of a few objections to some of these specifications by some of our members and refinery technologists, which we respect and consider and hope to smooth out, in time, so we can adopt these new specifications unanimously and present them to our own and to the refining industry.

We discussed these new specifications at a joint meeting of some of our members and of prominent refinery technologists during the American Petroleum Institute's meeting in Chicago last December. We wanted to learn directly from these men, representing the largest buyers of our products, their requirements as to the quality of our product.

Again we met with our friends at the manufacturers committee meeting of the Western Petroleum Refiners Association in Shreveport in March. S. S. Smith very capably presented and discussed the problem of proper specifications, and Emby Kaye treated the outage problem and the best manner of handling and shipping natural gasoline. I am sure the close contact gained during these discussions will foster a better understanding of our mutual problems.

We are most anxious to continue the friendly relations and good understanding with our customers, and, as an innovation, our program committee has prepared a most interesting program for Wednesday "Refiners Day."

We realize that the refiner is our natural customer and the customer has to be pleased. In these days of close margins, when frequently one cent per gallon means the change from "black" to "red" figures and vice versa, only full co-operation between manufacturer and customer, mutual confidence and fair play can keep both of our industries going.

We do not want the refiner to consider our product as a necessary evil, which is forced on him by some burdensome specifications and of which he wants to use only the absolute necessary minimum. Not at all! We endeavor and hope to convince him that our product selected as to the necessary characteristics, and blended in the correct proportion with his gasoline, will produce the best possible motor fuel he can offer the public and will be more profitable for him in the long run.

Association work is carried on almost altogether through committees. I have dwelled so far in my report, on the activities of the most important ones. I wish to give, however, due credit to some of the other committees and their chairmen, who assiduously have done their share of work in the interest of the Association.

Dr. E. R. Lederer, president of the Natural Gasoline Association of America

The Gas Contract Committee worked diligently during the past year preparing a model gas purchase contract form and filling a long felt need. The chairman, T. R. Goebel, will present and discuss this new contract during this convention.

The Gas Testing Committee completed its co-operation work with the Bureau of Standards in developing specifications and a method of procedure for our new specific gravity balance. Our Association defrayed the cost of this work by the Bureau of Standards and we hope this accurate new instrument will be of good assistance to the producers and buyers of natural gas and casinghead gas.

This same committee with George P. Bunn as chairman, has also achieved the adoption of the Reid vapor pressure method, now in use by the industry and recognized by the American Society for Testing materials. We are also assured that the Interstate Commerce Commission will make this method mandatory in their transportation regulations, effective Sept. 1, 1930.

The same committee has also been studying our joint code with the American Gas Association and is preparing to make recommendations for its improvement.

Mr. Bunn will have an opportunity during this convention to illustrate to you in detail, this most interesting and useful work of his committee.

Emby Kaye as chairman of the Outage Committee again has been untiring in his efforts to create a better understanding of the volatile character of our product and to promulgate a more thorough knowledge of the technique of loading and unloading natural gasoline.

His papers and discussions at the American Petroleum Institute and

Western Petroleum Refiners Association meetings were well received and greatly appreciated. To further this good cause he has written a number of very interesting articles in trade papers and personally interviewed quite a number of refiners and blenders. No doubt his efforts should result in minimizing losses at the loading rack and reduce the frequency of unfair, unjust and costly outage claims at the unloading end.

The plant operators meeting took place at Ranger on April 22. F. G. Yonker of the Chestnut and Smith Corp., and Dean Hiatt of the Texas Pacific Coal and Oil Co., were in charge of arrangements, ably assisted by Otto Peters of the Chestnut and Smith Corp.

It was a very successful, well attended affair and this committee, working far distant from headquarters, deserves our appreciation.

The newly appointed Publicity Committee kept our association, our aims and our product before the public eye through articles, either directly written or inspired.

It is hoped they, as well as all the other committees, will keep up the good work during the coming year.

Many of our member companies were well represented at the gas measurement course at Norman, Okla., of which Don A. Sillers was chairman.

I know it is expected of the president of this Association to review in his address, the economic condition of the industry.

The past year was characterized by curtailment and prorating of production—partly voluntary, partly forced by governmental authorities. Some of our members with large plant, representing considerable investment, in such prorated or curtailed districts have suffered, it is true. But, I believe, the entire industry welcomes and approves such restrictive steps as long as they are systematic, reasonable and fair. Without these, reckless overproduction by individuals, only concerned with possible momentary profits, might create, at least, temporary chaotic conditions with prices below cost of production for everybody.

Our industry has maintained a very fortunate equilibrium. We produced last year, 2,195,400,000 gallons as compared with 1,777,700,000 in 1928, or 28 per cent more than in 1928.

California, especially Santa Fe Springs and greater Seminole furnished this increase. In 1930 we may expect Oklahoma City, West Texas and New Mexico flush pools to furnish the increase.

Fortunately for our industry this increase of 417 million gallons was practically absorbed by refineries and export business, and our stocks remained almost even. In 1929 gasoline demand increased 13 per cent over 1928; gasoline production (of which natural gasoline represents about 12 per cent) increased 17 per cent.

Petroleum economists estimate the consumption for 1930 as follows: Gasoline—1,107,000 barrels or 46,494,000 gallons daily; Natural Gasoline—143,000 barrels or 6,006,000 gallons daily representing 12.92 per cent of the total gasoline demand.

According to Bureau of Mines figures for the first quarter of 1930, the daily production of natural gasoline averages 6,180,000 gallons, which figures would indicate that stocks must have increased slightly, but not alarmingly.

Unless an unexpected flood of natural gasoline breaks in on us, which cannot be taken care of by increased refinery or export demand during the summer season, our stocks should remain on a sound level also this year.

A. J. Schlosser, head of the natural Gasoline department of the Barnsdall Corp. and vice president of the Natural Gasoline Association of America

Average prices for our products were the lowest in 1929 since 1927. We did not quite reach the lowest figures of 1927, but the highest price we got for our grades in 1929 did not reach the high figures of 1927.

We might as well face the facts that low gasoline prices mean low prices for our products!

In my opinion, it is a wonderful and reassuring proof of the sturdiness and vitality of this, our industry, that when confronted with such adverse conditions, we all took the bit between the teeth, increased the efficiency of our plants, cut the overhead all possible, lowered our costs of production, made better products, and utilized our by-products and created new diversified markets for all our products.

Although the outlook for 1930 is none too rosy, ours is a healthy industry and we will survive in spite of overproduction and low prices and most of us, I sincerely hope all of us, will show again profits when the balance sheet for 1930 is made up.

Before closing my review of the year's activities, I wish to welcome to our ranks three new members. I am very happy that our annual convention did not have to pass without the presence of our genial friend, D. E. Buchanan, who after a short absence, which we all hoped to be only of short duration, has returned to us as representative of Hanlon-Buchanan, Inc. I also wish to greet the Anglo-Persian Oil Co. represented by B. R. Jackson and the Columbian Gasoline Corp. represented by W. E. Reardon. We hope you will attend as many of our meetings as possible and become active members for the benefit of our industry. Our facilities are at your disposal.

Our secretary reports that several other companies are expressing considerable interest in membership and we hope to acquire soon several more useful members.

We need more members, active support and co-operation, and each of you should endeavor to induce desirable manufacturers of natural gasoline to join our association for the good of the industry and for his own benefit.

Personally, I wish to thank the other officers and directors, all the active committee members for their splendid and full-hearted co-operation. It was a great pleasure to work with you.

We held 11 directors meetings during the past fiscal year; every one had a good live docket and we had a splendid attendance at each meeting and accomplished a lot; we never had to postpone a single meeting.

The active committees are the ones which deserve our heartfelt appreciation. They did an enormous amount of useful work, regardless of time, personal inconvenience and expense. The entire industry and each individual member is bound to benefit from their work.

To each one of these men and to generous employes, who made their work possible, we all owe a tribute of gratitude.

This is your association, its activities are not directed by a few very large and domineering factors in the industry; there is no room for politics, every director, every member of a committee is a serious-minded, faithful employee of his company which he represents, and attendance at any kind of meeting is to us just part of our duty and just as important as any other kind of work we perform in the employ and in the interest of our company.

This is the reason why this association accomplishes things in a decisive, definite and quick manner, whenever such a necessity arises, and why this association has received recognition as a creative body of men, and as an important branch of the petroleum industry.

Let us maintain this high standard and support to the best of our ability our worthy association.

Determining the Properties of Natural Gasoline Blends by Charts

By E. W. Zubin*

(Presented before Natural Gasoline Association of America, Tulsa, May 21)

REFINERS have come lately more and more to realize the importance of natural gasoline. The motoring public has been educated by sales propaganda to ask for high test, or high volatility, gasoline. Research has provided a large amount of data proving the importance of proper volatility.

Recent work has very definitely correlated the American Society for Testing Materials, distillation with certain phases of performance in the motor. Today we know that ease of starting and the 10 per cent point of the A.S.T.M. distillation are closely related.

Acceleration depends on effective volatility, which in turn can be predicted from the intermediate, the 35 to 60 per cent points of the distillation. Volatility and knock rating show certain relations, and the troublesome vapor lock has now been recognized to be the result of excessive volatility.

Few crudes produce straight run gasolines sufficiently volatile to conform with the prevailing standards. Most refiners have to add natural gasoline to their product, even when the requirements are no better than U. S. Motor specifications.

Blending with natural gasoline is an art as old as the natural gasoline industry. In spite of the many years during which blending has been practiced, the quantities to be added are usually determined by guessing, a method based on the experience of the operator, rather than on figures and charts.

This is the more surprising as it is relatively easy to construct fairly accurate blending charts for various purposes. Perhaps the reason for this lies in the difficulty to find blending curves that apply to any grade of natural gasoline, or straight gasoline. This difficulty can be overcome by expressing all blending data in per cent of the difference between respective points.

It is our purpose to present a blending chart for practical use. The need for such a chart has long been known and it is hoped that this contribution helps to reduce the time and labor now spent to blend gasoline to specifications, and to permit process men to make more accurate calculations as to disposal of tanks and tank cars. This latter point is especially important in refineries where several grades of gasoline are manufactured, and where the tankage is limited. Very often a tank must be held because the laboratory will not give its ok, till more natural gasoline has been added. Many valuable hours may thus be lost. Such trouble can be avoided by consulting blending charts such as the one proposed.

In this paper no attempts have been made to give any theoretical explanation for the curves developed, nor have calculation of any kind been made. The charts are merely the outcome of a systematic collection of blending data over a long period of time. As previously mentioned, they are based on the principle of expressing the properties of the blends in per cent of the difference between equivalent properties of the blending stocks. This per cent difference is plotted against the per cent of natural gasoline.

To make this point clear consider for instance the 10 per cent points of two blending stocks: That of a naphtha of 200 degrees F. and that of a natural of 70 degrees F. The difference is 130 degrees F. We find that, upon addition of 20 per cent of this natural, to the naphtha, the 10 per cent point of the latter drop to 144 degrees F. which is 56 degrees F. lower than the original; 56 degrees constitutes 43 per cent of the total difference of 130 degrees. This gives us one point for the curve at 20 per cent natural gasoline. On blending any other naphtha with 20 per cent of any other natural gasoline we find that the 10 per cent point of the naphtha again drops 43 per cent of the total difference within close limits.

The accuracy of the curves thus constructed is fairly good. The largest deviation ever found and checked amounted to 5 per cent of the total difference, or 5 per cent of the per cent of natural added. Larger deviation always could be traced to poor mixing, or errors in the A.S.T.M. distillation.

The properties covered by the present work are: the 10 per cent point, 50 per cent point, distillation loss of the A.S.T.M. distillation, the vapor pressure (and vapor lock) and the knock rating.

When working with the A.S.T.M. distillation, or points of it, one always has to keep in mind that there are two series to be considered; the one uncorrected, as it is taken down during the test, and the other one corrected for distillation loss. In my experience in most routine laboratories little attention is paid to correcting any points, though the latest government specifications require it for the 10 per cent point.

Concerning our blending charts it was found that in order to make them applicable to all grades of naphthas or natural gasolines, the uncorrected 10 per cent and the corrected 50 per cent or higher points must be used. Just why this is the case is a matter of speculation. Possibly it has to do with the distribution of the distillation loss over the lower end of the distillation curve and also with the predominant influence of the lighter stock on the lower points only.

For practical reasons it is fortunate that the 10 per cent point need not be corrected to figure the resultant blend. It would be difficult and highly inaccurate to estimate the correction for the 10 per cent point of a natural with 10 per cent or more distillation loss.

According to the Bureau of Standards, a reduction of 5.4 degrees F. shall be made for every cubic centimeter distillation loss below 5 cubic centimeters. This represents a fairly good average correction and avoids the trouble of having to draw the distillation curve. However, where the distillation loss exceeds 5 per cent the possible error of the average correction factor becomes so great that the distillation curve must be used. Where the loss is greater than 8 per cent, the 10 per cent can no longer be corrected accurately even with the aid of the curve, because in such a case the distillation loss is not confined to the first 10 per cent coming over; but is distributed over a much wider range.

For the 50 per cent point conditions are quite different. It is necessary to use the corrected values in order to obtain a smooth curve applicable to all grades of blending stocks. The difficulties encountered for correcting this point are not as great as for the 10 per cent point. For most purposes it is sufficient to deduct 2.4 degrees F. for every cubic centimeter

*Texas Pacific Coal & Oil Co.

Fig. 1
10 per cent point vs. per cent casinghead

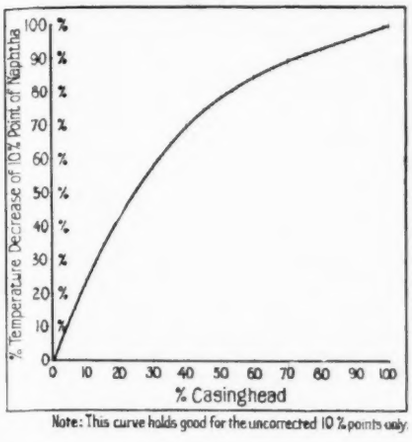


Fig. 2
50 per cent point vs. per cent casinghead

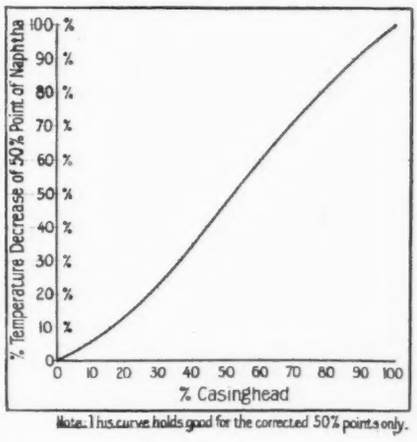


Fig. 3
Distillation loss vs. per cent casinghead

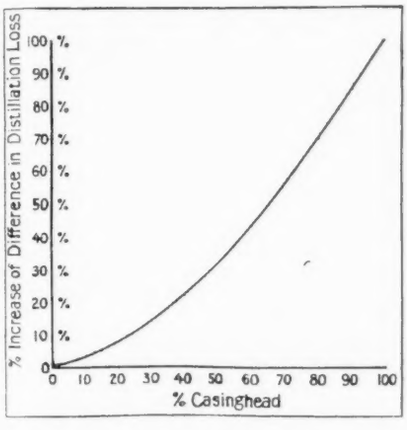
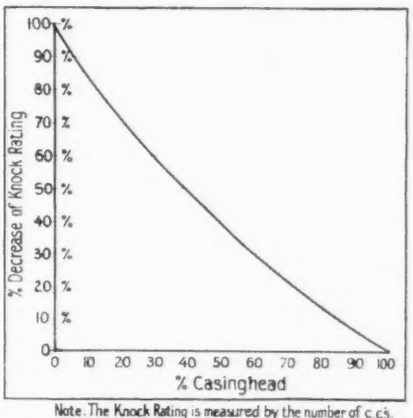


Fig. 4
Knock rating vs. casinghead


% Decrease of Knock Rating
% Casinghead
Note: The Knock Rating is measured by the number of c.c's. of Lead Tetraethyl required to bring the fuel to Ethyl Standards

Figs. 1 to 4 above are the curves constructed from laboratory data by the author, showing the change of properties with the addition of natural gasoline, which curves are the basis of the blending charts. How the data shown in these figures has been translated on the blending charts is gone into in the article

distillation loss, even where this loss exceeds 5 cubic centimeters. If greater accuracy is desired the only way out is to draw the distillation curve and to translate it to the right for the amount of the loss.

Uncorrected points above 50 per cent are usually little affected by the addition of small percentages (less than 30 per cent of natural gasoline.) Addition of 10 per cent or less may even raise them slightly, because the influence of the increase in distillation loss exceeds the actual lowering. The corrected points of natural gasoline blends (including the 90 per cent) of course are always lower than those of the original naphtha. However, there is no simple way, such as the deduction of a constant value for every cubic centimeter distillation loss, to approximately correct the 90 per cent point. The distillation curve must be drawn and this is rather impractical. For these two reasons the 90 per cent point has not been included in the present series.

Other points of the A.S.T.M. distillation such as the initial boiling point, the 20 per cent and the final boiling point were omitted because, according to work published by G. G. Brown of the University of Michigan, and O. C. Bridgeman, Bureau of Standards, they have little or no relation to any of the actual performance characteristics.

Much has been said lately about vapor lock. Brown showed, and the writer has done work supporting his opinion, that the best single test for vapor lock is the vapor pressure as measured by any of the methods giving reproducible results such as the Reid bomb method. In most gasolines the 10 per cent point and the vapor pressure show a close relation, but exceptions have been found. Brown's empirical formula correlating the 10 per cent point and vapor lock is subject to similar exceptions.

Gasoline manufacturers who desire to estimate the vapor lock tendency of their product from the vapor pressure may consult the section on vapor pressure of the present chart. The scale for vapor lock temperatures is based on the assumption that vapor lock occurs, or may occur, at the temperature at which the Reid vapor pressure equals atmospheric pressure. (14.7 pounds per square inch).

Brown observed that the temperature of gasoline in the average carburetor readily climbs as high as 100 degrees F. plus ½ atmospheric temperature degrees F. Therefore, the vapor lock temperature of gasoline should not be lower than the temperature calculated by the above formula, taking for the atmospheric temperature a high seasonal average of the district in which the product is sold.

Noteworthy is the change of knock rating caused by the addition of natural gasoline. One might expect that the grade or the source of the natural would influence its knock rating. It was found, however, that all naturals, with exception of some of the Grades A have the same knock rating within close limits, as determined by the bouncing pin method and expressed in the Ethyl scale. The theoretical knock rating of natural gasoline is about zero, i. e. equal to the present Ethyl Standard. Well stabilized natural gasolines, being superior from the point of view of volatility, very often have a slightly poorer knock rating. In preparing the curve showing the knock rating versus per cent natural, blends were made containing up to 70 per cent natural.

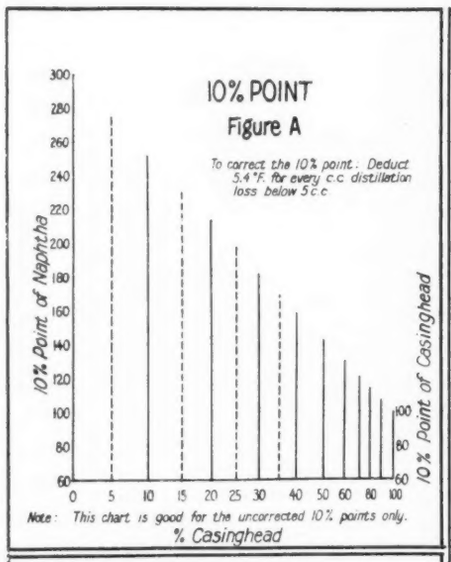
Altogether 84 blended samples (not including Grade A) were tested and the following deviations from the curve were noted:

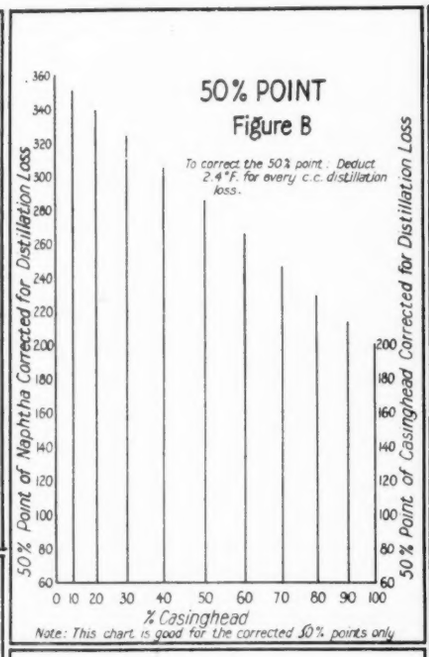
Number Samples	Deviations c.c. lead tetraethyl
32	0
48	.1
4	.2
84	

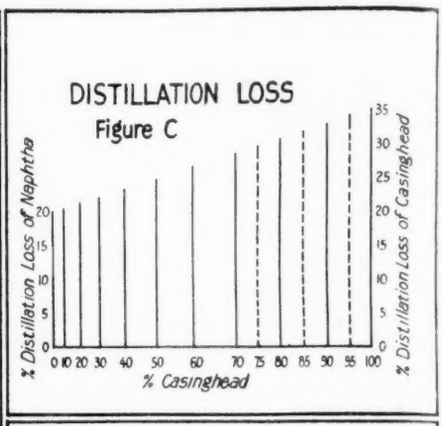
Natural gasolines from Pennsylvania, Mid-Continent, California, West Texas, Gulf Coast and Venezuela were included in the tests.

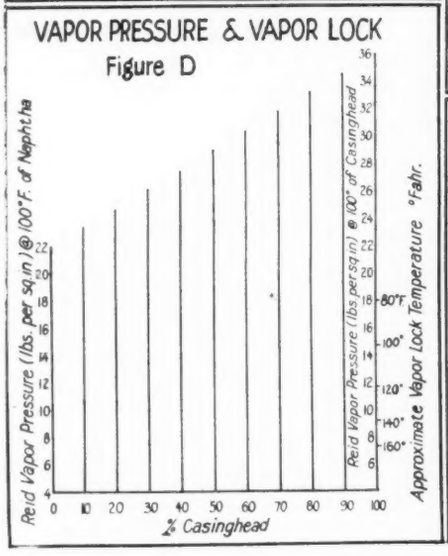
The curves constructed from laboratory data (Figures 1 to 4) showing the change of properties with the addition of natural are the basis for the blending chart. In the latter the properties of the two blending stocks are evenly distributed on vertical scales, while the horizontal scales for the per cent of natural gasoline have been derived by transcribing on the abscissa the vertical distances of the curves from the abscissa for various percentages of natural. By using such scales the curves for all properties become straight 45 degree line. Thus the blending charts have been brought to a form in which all relations are expressed by straight lines, and problems can be solved by the mere application of a straight edge.

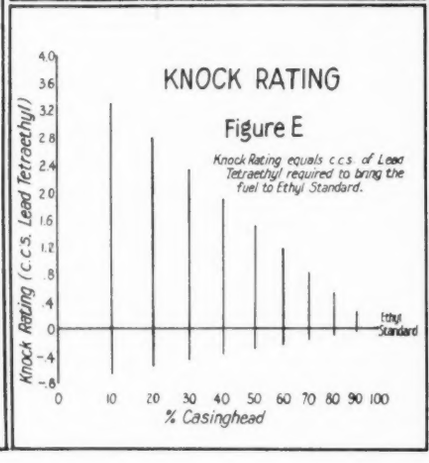
To explain the use of the chart


10% POINT
Figure A
To correct the 10% point: Deduct 5.4 °F. for every c.c. distillation loss below 5 c.c.
10% Point of Naphtha
10% Point of Casinghead
Note: This chart is good for the uncorrected 10% points only.
% Casinghead


50% POINT
Figure B
To correct the 50% point: Deduct 2.4 °F. for every c.c. distillation loss.
50% Point of Naphtha Corrected for Distillation Loss
50% Point of Casinghead Corrected for Distillation Loss
% Casinghead
Note: This chart is good for the corrected 50% points only






KNOCK RATING
Figure E
Knock Rating equals c.c.s. of Lead Tetraethyl required to bring the fuel to Ethyl Standard.
Knock Rating (c.c.s. Lead Tetraethyl)
Ethyl Standard
% Casinghead

BLENDING CHARTS FOR CASINGHEAD GASOLINES

To use the charts: Draw a straight line from the point indicating the property of the naphtha on the left hand vertical scale to the point indicating the property of the casinghead on the right hand vertical scale. Where the line intersects with the horizontal through the desired point, draw a vertical line and read the % casinghead on the bottom scale. . . . . .

the following example shall be demonstrated:

A certain gasoline stock on hand having the following properties:

10% @ 200° F.

50% @ 291° F. uncorrected, 290° F. corrected.

Distillation loss—½%

Reid vapor pressure @ 100° F. 4.2 lbs.

Knock Rating—2.4 cc. lead tetraethyl poorer than Ethyl Standard, shall be blended with a natural of the properties:

10% @ 70° F.

50% @ 110° F. uncorrected; 95° F. corrected;

Distillation loss 14%

Reid vapor pressure @ 100° F.—32 lbs.

It is desired to produce a gasoline having a 10 per cent point of 150 degrees F. uncorrected. How much natural gasoline is required? How will the other properties be affected? Is the blend safe from the point of view of vapor lock?

To find the per cent of natural required, use Figure A. Connect with a straight edge the 200 degree point on the left hand scale with the 70 degree point on the right hand scale. Where the line intersects with a horizontal through 150 degrees, draw a vertical line to the natural scale. Read the per cent, in our case 17½.

In order to find the 50 per cent point of the blend we must use the corrected data given. Connect the 290 degree point on the left hand scale of Figure B with the 95 degree point on the right hand scale by means of a straight edge. At the point of intersection with the vertical line through 18 per cent natural, draw a horizontal line. Read the corrected temperature, in our case 268 degrees F.

In order to estimate the 50 per cent point, as it would be read on the thermometer, the distillation loss must be determined in Figure C—in a similar manner as described above. For every cubic centimeter distillation loss below 5 cubic centimeters 2.4 degrees F. must be added. In our example we find 1.5 cubic centimeters distillation loss and an uncorrected 50 per cent point of 272 degrees F.

The Reid vapor pressure corresponding to 17½ per cent of natural, as found on Figure D, is 9.4 pounds at 100 degrees F., and the vapor lock temperature is 138 degrees F. This gasoline is safe as to vapor lock at atmospheric temperatures up to 76 degrees F.

The knock rating of the blend as determined on Figure F is 1.8, that is to say 1.8 cubic centimeters of lead tetraethyl are required to make its knock equal to that of Ethyl Standard.

Other problems, such as the determination of the properties required of a natural to produce a blend of certain specifications, can be solved just as easily with the present chart.

If there should be a demand for specifications of other properties not covered by this paper, such as the proposed per cent over at 100 degrees F. for natural gasolines, additional charts can be constructed easily as long as the principles outlined here are followed.

Theoretical Analysis of Absorption Process

By Alois Kremser*

(Presented before Natural Gasoline Association of America, Tulsa, May 20-22)

IT IS the purpose of this paper to present a mathematical analysis of the relations underlying the oil absorption process, especially as applied to the extraction of gasoline from natural gas. General equations are derived for evaluating the effect of important variables, such as pressure temperature, oil rate, number of plates, plate efficiency, richness and composition of gas, physical properties of absorption oil, etc. on the performance of absorbers and on the efficiency of extraction.

To simplify the mathematical analysis, the assumption is made that pressure, oil rate, gas rate and temperature are constant throughout the absorber. This condition is approximated in average field practice, especially if efficient extraction of butanes is attempted. The assumption is not fulfilled with gases of abnormal richness such as refinery vapors or with high pressure plants in which a high saturation of the oil is obtained. In such cases it will be necessary to apply the theory to the conditions as they obtain both at the top and bottom of the absorber and to estimate probable results from the data thus computed.

Absorption is essentially a vapor pressure phenomenon. The driving force is the difference between the partial pressure of a constituent in the gas and the vapor pressure due to the portion absorbed in the liquid. If this difference is zero, no further absorption is possible; in other words, equilibrium has been reached. The mathematical treatment is based on the assumption that Raoult's law may be applied. This is another limitation of the analysis.

It will be shown that computations based on the total gasoline content of gas, without regard to its composition, must, by necessity, be misleading. The absorption of each constituent, such as butane, pentane, etc., is practically independent of the others. The absorption of each constituent of the gas will, therefore, be treated individually.

The theory presented here has been a valuable aid in our operation, as a basis for evaluating test data for plant control and design of new plants. Experience with over forty plants covering practically all the variations encountered in normal practice has indicated that the assumptions outlined above do not detract seriously from the usefulness of the theory for all practical purposes.

*Research and Development Dept. Standard Oil Co. of California.

Part I—Derivation of Equations

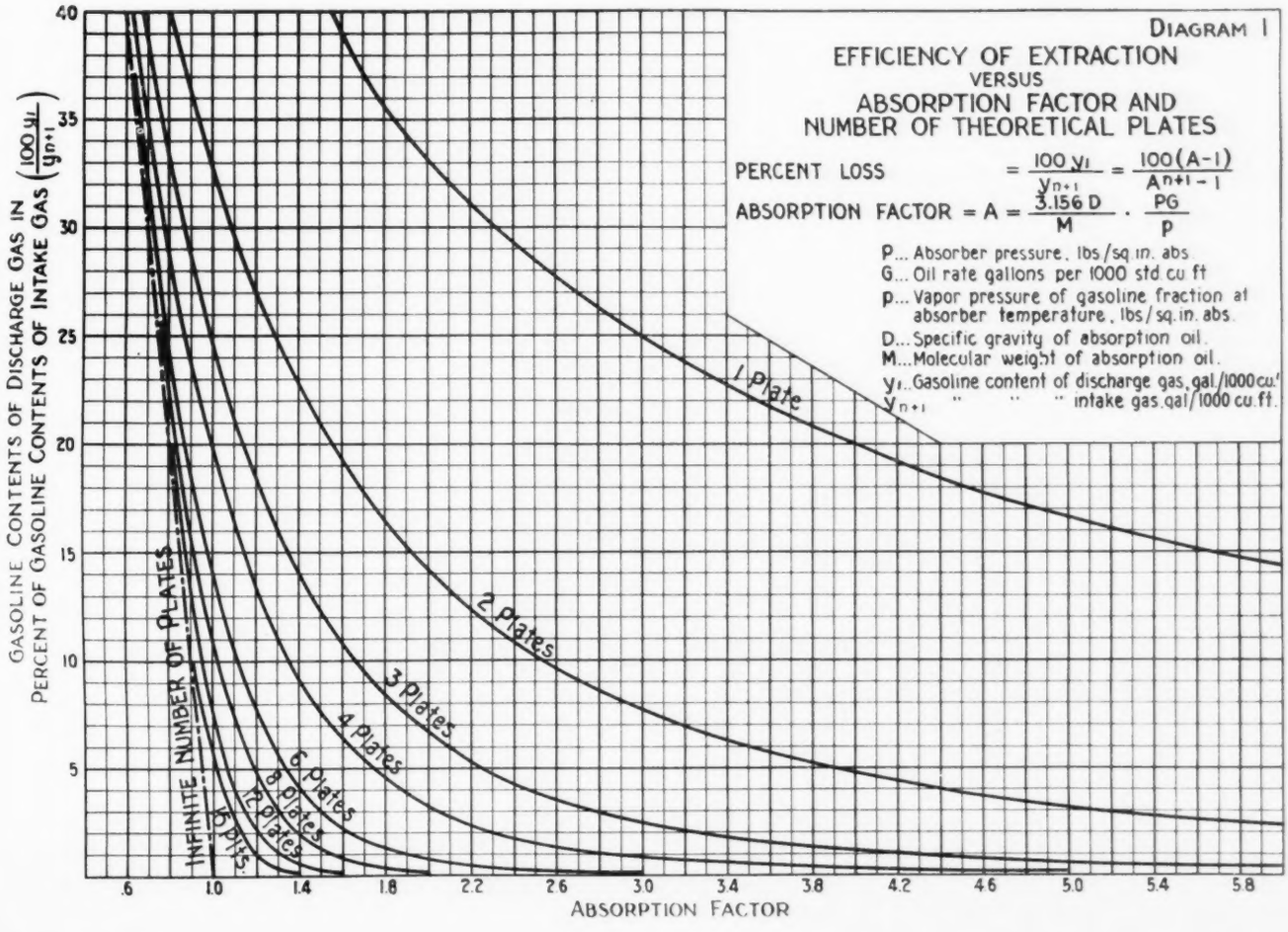
1. Nomenclature

P Absorber pressure, pounds per sq. in. absolute.

p Vapor pressure of gasoline fraction at a given temperature, pounds per sq. in. absolute.

G Oil to gas ratio, gallons per 1000 standard cu. ft. (measured at 60°F. and 14.7 lbs. per sq. in. abs.).

Y Gasoline content of gas, gallons per 1000 standard cu. ft.



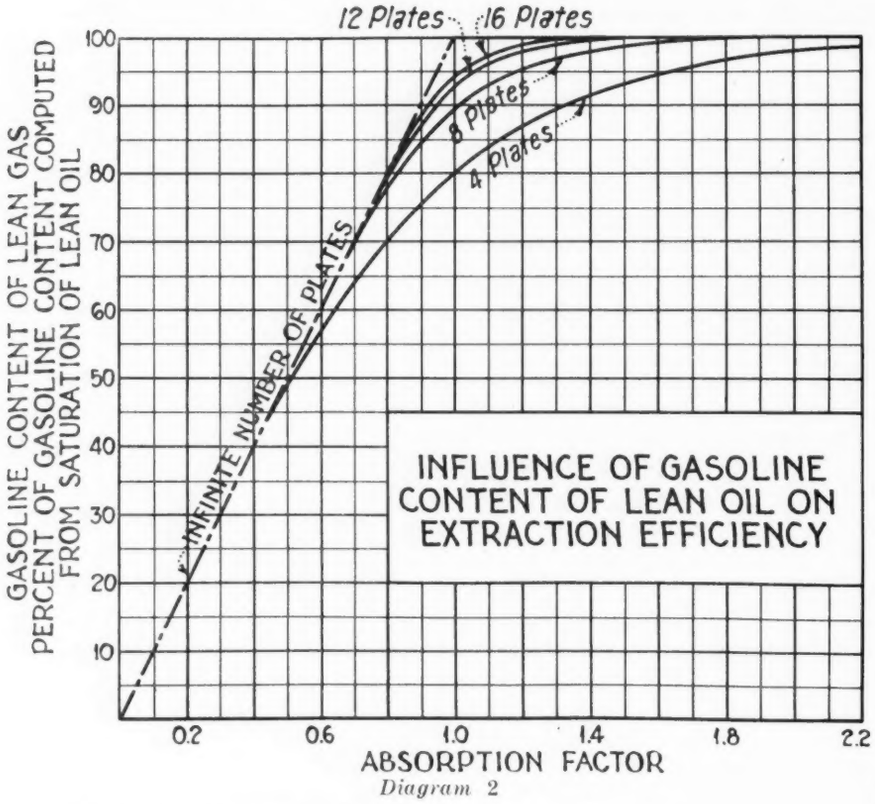


Diagram 2

x Saturation of oil, per cent gasoline by volume.

q Equilibrium constant, defining the equilibrium between x and y; $x = qy$.

S Saturation of oil, expressed in mol per cent.

r Ratio of mol percentage to vol. percentage.

V Standard cubic feet of vapor per gallon of gasoline.

M Molecular weight of absorption oil (sponge).

m Molecular weight of gasoline fraction.

D Specific gravity of sponge.

d Specific gravity of gasoline fraction.

t Temperature °F.

n Number of plate, plate $n+1$ is below plate n

A Absorption factor $A = \dfrac{Gq}{100}$

2. Equilibrium Relations

(a) *Relation between mol percentage and volume percentage.* The vapor pressure of the solute is proportional to the molecular percentage. As it is customary to use volume percentages in plant practice, a simple relation between the two is desirable:

Given: M and m *molecular* weight of sponge and gasoline fraction. D and d specific gravity of sponge and gasoline fraction. 100-x and x volume percentages.

The number of mols will be proportionate to:

$$\frac{xd}{m} \text{ and } \frac{(100-x)\,D}{M}$$

The mol percentages will, therefore, be:

$$S = \frac{100\,\dfrac{xd}{m}}{\dfrac{xd}{m} + \dfrac{(100-x)\,D}{M}} \qquad (1)$$

$$S = \frac{100x}{x\left(1 - \dfrac{Dm}{dM}\right) + 100\,\dfrac{Dm}{dM}}$$

In absorption practice the saturation is generally sufficiently low to permit neglecting the first term in the denominator. Equation 1 can, therefore, be simplified to:

$$S = x\,\frac{dM}{Dm} \qquad (2)$$

The ratio r of mol percentage to volume percentage is, therefore:

$$r = \frac{dM}{Dm} \qquad (3)$$

(b) Equilibrium equation

If a gas at an absolute pressure P contains Y gallons per 1000 standard cu. ft. of a gasoline fraction having V cu. ft. of vapor per gallon of liquid, the partial pressure of the vapor will be:

$$\text{Partial pressure} = \frac{YVP}{1000} \text{ pounds per sq. in.}$$

If the absorption oil contains x volume per cent of a gasoline fraction, which has at a given temperature a vapor pressure p and a mol-vol per cent ratio r, the vapor pressure of the absorbed gasoline will be:

$$\text{Vapor pressure} = \frac{rxp}{100} \text{ pounds per sq. in.}$$

For equilibrium the partial pressure and vapor pressure as defined above will be equal, or

$$\frac{rxp}{100} = \frac{YVP}{1000}$$

$$x = \frac{VP}{10rp}\,Y = qY \qquad (4)$$

A general relation may be derived for V the volume of vapor per gallon, from the fact that one gallon weighs 8.33d pounds, and that the pound mol of all gases (at 60° F. and 14.7 lbs. per sq. in.) has a volume of 379 cu. ft. V may be computed, therefore, from the relation:

$$V = \frac{833d}{m}\,\frac{379}{} = 3156\,\frac{d}{m} \qquad (5)$$

By combining equations 3, 4 and 5 the equilibrium equation assumes the form:

$$x = \frac{3156\,dPDm}{m10dMp}\,Y = qY \text{ and}$$

$$q = \frac{3156\,DP}{Mp} \qquad (6)$$

q may be defined as the equilibrium constant. It is a function of absorber pressure, vapor pressure of gasoline fraction and physical properties of sponge, but independent of all other variables involved in the absorption process.

3. Analysis of Single Plate

The n^{th} plate shall be considered. Oil from the plate above will enter it with a saturation x_{n-1}, gas from the plate below with a gasoline content Y_{n+1}. Oil and gas will approach on the n^{th} plate an equilibrium, depending on temperature and pressure conditions, defined by equation (4), namely:

$$x_n = qY_n$$

The oil rate is assumed as G gallons per 1000 cu. ft. G gallons of oil entering with saturation x_{n-1} and leaving with x_n will take up:

$\dfrac{G}{100}\,x_n - x_{n-1}$ gallons of gasoline

One thousand cubic feet of gas entering with gasoline content Y_{n+1} leaving with Y_n give up

$Y_{n+1} - Y_n$ gallons of gasoline.

The two quantities must be equal, also the equilibrium equation (4) may be applied as follows:

$$\frac{G}{100}\,(x_n - x_{n-1}) = Y_{n+1} - Y_n$$

$x_n = qY_n$ and $x_{n-1} = qY_{n-1}$

These equations may be combined, as follows:

$$\frac{Gq}{100}\,Y_n - Y_{n-1} = Y_{n+1} - Y_n$$

The term $\dfrac{Gq}{100}$ shall be defined by the symbol A and designated as *absorption factor*

$$A = \frac{Gq}{100} \quad (8)$$

Equation 7 can be solved for Y_n giving the important relation:

$$Y_n = \frac{Y_{n+1} + A\,Y_{n-1}}{1 + A} \quad (9)$$

4. Absorption Factor

It is evident from the above derivation, that the performance of an absorber may be defined in terms of a single factor designated as absorption factor. By combining equations 6 and 8 it may be expressed by the relation:

$$A = \frac{3156\ DPG}{Mp} \quad (10)$$

It will be noted that the absorption factor is directly proportional to absorber pressure and oil rate, and inversely proportional to the molecular weight of the absorption oil and the vapor pressure of the individual gasoline fractions, which, in turn, are defined by temperature.

According to this derivation, the absorption factor defines completely the absorption phenomenon; in other words, it is immaterial under what conditions the absorption process is carried out as long as the value of the absorption factor remains constant.

5. THE MULTIPLE PLATE ABSORBER

(a) Single Plate Absorber

By applying equation 9 to a single plate it may be written:

$$Y_1 = \frac{Y_2 + AY_0}{1 + A} \quad (11)$$

Y_2 is evidently the gasoline content of the gas entering the plate and, therefore, the absorber. Y_0 is the gasoline content of a gas in equilibrium with the known saturation x_0 of the oil entering the absorber and may be computed from the latter by the relation $x_0 = qY_0$.

(b) 2-plate Absorber

The gasoline content of the gas leaving the bottom plate may be computed from equation (9):

$$Y_2 = \frac{Y_3 + AY_1}{1 + A} \quad (12)$$

By introducing Y_1 from equation 11 and solving for Y_2, the following relation is obtained:

$$Y_2 = \frac{(A+1)\,Y_3 + A^2 Y_0}{A^2 + A + 1} \quad (13)$$

(c) 3-plate Absorber

By applying equation 9 to Y_3 and substituting equation 13 for Y_2 and solving for Y_3, the latter may be expressed as:

$$Y_3 = \frac{Y_4\,(A^2 + A + 1) + A^3 Y_0}{A^3 + A^2 + A + 1} \quad (14)$$

This may also be written in the the form:

$$Y_3 = \frac{\dfrac{A^3 - 1}{A - 1}\,Y_4 + A^3 Y_0}{\dfrac{A^4 - 1}{A - 1}} = \frac{(A^3 - 1)\,Y_4 + A^3\,(A-1)\,Y_0}{A^4 - 1} \quad (15)$$

(d) n Plate Absorber

Equation 15 for the three plate absorber indicates the form of the general equation. It may be written:

$$Y_n = \frac{Y_{n+1}\,(A^n - 1) + (A-1)\,A^n\,Y_0}{A^{n+1} - 1} \quad (16)$$

The gasoline content Y_n of the gas leaving the bottom plate is of little interest. But the saturation x_n of the oil leaving the absorber may be computed from equation 16 and the relation $x_n = qY_n$.

Of special interest is the gasoline content of the gas leaving the absorber, or in our nomenclature Y_1. It may be found as follows:

The gasoline extracted by G gallons is:

$$\frac{G\,(x_n - x_0)}{100}$$

the gasoline given up by 1000 cu. ft. $Y_{n+1} - Y_1$ Therefore

$$\frac{G\,(x_n - x_0)}{100} = Y_{n+1} - Y_1$$

or introducing $x_n = qY_n$;

$x_0 = qY_0$; and $\dfrac{Gq}{100} = A$

$$A\,(Y_n - Y_0) = Y_{n+1} - Y_1 \quad (17)$$

Combining 16 and 17, there results the important equation:

$$Y_1 = \frac{(A-1)}{A^{n+1} - 1}\,Y_{n+1} + \frac{A\,(A^n - 1)}{A^{n+1} - 1}\,Y_0 \quad (18)$$

Y_{n+1} is the gasoline content of the gas entering the absorber.

$Y_0 = \dfrac{x_0}{q}$ can be computed from the saturation x_0 of the lean oil entering the absorber. The absorption factor A has been discussed above. Equation 18 represents, therefore, a general solution of the absorption problem, by which all factors entering the problem may be evaluated.

It will be noted that the first term in equation 18 is only a function of the richness of the gas entering the absorber, of the absorption factor and of the number of plates. It represents the limit to which the gasoline content of the gas could be reduced if the oil entering the absorber were perfectly stripped, that is, would contain no gasoline fractions. The second term defines the limitations imposed on absorption efficiency by the gasoline content of the lean sponge, that is, of the oil entering the absorber. The two terms are entirely independent of each other, except that their sum represents the gasoline content of the gas leaving the absorber.

6. Relation Between Equilibrium and Transfer Theory

The analysis so far has been based on equilibria only without any regard to the mechanism by which equilibrium is established. Actually the transfer of gasoline fractions from vapor to liquid will depend: on the driving potential, that is, the difference between the partial pressure in the vapor phase and the vapor pressure in the liquid phase; the contact area between liquid and vapor, be it in the form of grids or similar con-

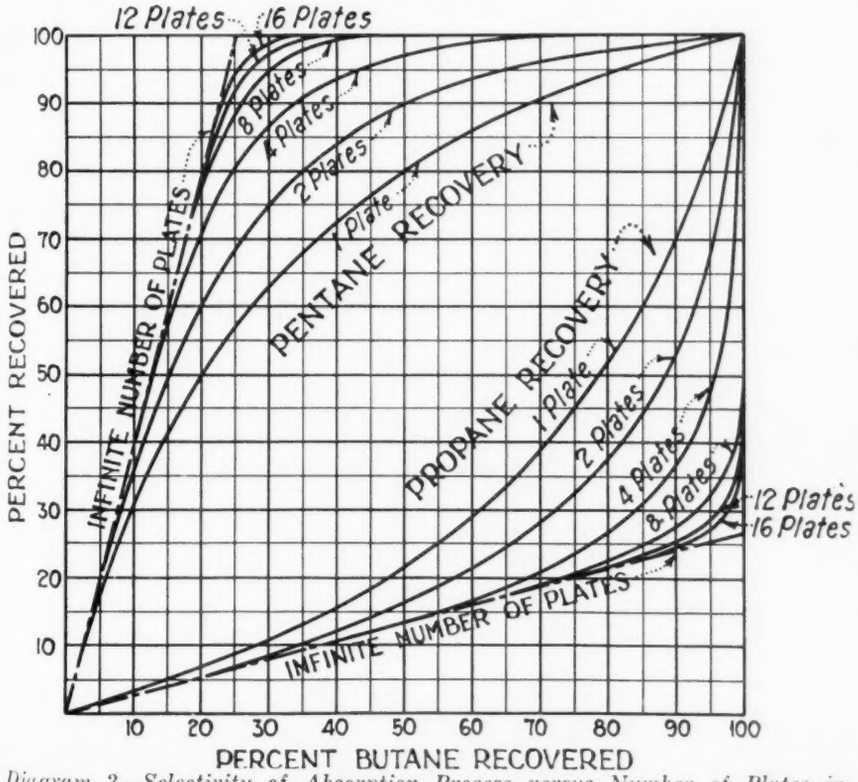


Diagram 3—Selectivity of Absorption Process versus Number of Plates in Absorber

tact devices, or in the form of bubbles, as in plate absorbers; the time of contact; and the transfer coefficient, that is, the amount transferred per unit of area in unit time per unit of driving potential.

The absorber may be assumed as subdivided into a number of equal units, each representing a theoretical plate. The transfer surface and time of contact available in each unit will be substantially constant, especially for the problem discussed, in which the flow rates of both liquid and gas are essentially constant throughout the absorber.

The transfer factor is primarily a function of the physical properties of the substances involved and of velocity. It will, therefore, be substantially constant throughout the absorber.

Under these conditions an analysis based on equilibria will be justified only if it can be shown that the amount transferred on each theoretical plate is proportionate to the driving potential on each plate.

This condition is fulfilled, as shown by the following analysis of the n^{th} plate:

Q_n amount transferred on n^{th} plate.

F_n initial driving potential on n^{th} plate.

Gas enters and leaves the n^{th} plate with a richness Y_{n+1} and Y_n. The amount transferred is therefore:

$$Q_n = Y_{n+1} - Y_n \qquad (19)$$

By substituting equation 9 for Y_n 19 may be written:

$$Q_n = \frac{A}{1+A}(Y_{n+1} - Y_{n-1}) \qquad (20)$$

The partial pressure of the entering gas is $Y_{n+1}\frac{VP}{1000}$. The vapor pressure of the sponge, coming from plate $n-1$ with saturation x_{n-1} is $x_{n-1}\frac{pr}{100}$. The inital driving potential is therefore:

$$F_n = Y_{n+1}\frac{VP}{1000} - x_{n-1}\frac{pr}{100} \qquad (21)$$

According to equation 4, the second term in equation 21 may be written:

$$x_{n-1}\frac{pr}{100} = \frac{VP}{1000}Y_{n-1}$$

Equation 21 therefore assumes the form:

$$F_n = \frac{VP}{1000}(Y_{n+1} - Y_{n-1}) \qquad (22)$$

Equations 20 and 22 may be combined as follows:

$$\frac{Q_n}{F_n} = \frac{1000A}{VP(1+A)} = constant \qquad (23)$$

It is found that the amount of gasoline transferred on each theoretical plate is directly proportional to the initial driving potential, although the analysis is based on equilibria only. Without discussing these relations in further detail, the conclusion appears justified that under these conditions the final results would be substantially the same, whether the absorption phenomenon is analyzed from the viewpoint of the transfer or from that of the equilibrium theory.

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PART II
Application To Plant Practice

The mathematical relations established in the first part of the paper permit a quantitative evaluation of every important variable entering the absorption problem. One of the most important variables, it has been shown, is the absorption factor. Since the value of the latter depends on the vapor pressure of the individual gasoline constituents it will be evident that with other conditions such as pressure, oil rate, etc. constant, the absorption factor for butane will be much lower than that of pentane; in other words, the absorption of every gasoline constituent will have to be treated individually.

In general it will be desirable, however, that extraction of the heavier constituents beginning with iso-pentane be as complete as possible. Butane extraction will be more or less complete, depending on the quality of natural gasoline desired. The size of plant and general operating conditions will be determined, therefore, primarily by the requirements as regards butane extraction.

The absorption factor for butane, or briefly the *Butane Factor*, will, therefore, be of special significance. For that reason it will be desirable to use the Butane Factor as a basis for the general analysis of the problem, and to define the conditions, which will insure any desired extraction efficiency for other constituents in terms of the Butane Factor.

1. Relations Between Gasoline Content, Absorption Factor and Number of Plates

In the ideal case, that is, if the oil entering the absorber is free of gasoline constituents, the second term in equation 18 is zero. It may be written, therefore, in the form:

$$\frac{100Y_1}{Y_{n+1}} = \frac{100\,(A-1)}{A^{n+1}-1} \qquad (24)$$

Y_1 and Y_{n+1} are the gasoline content of the gas leaving and entering the absorber, or equation 24 gives the gasoline content of the discharge gas, expressed as a percentage of the gasoline content of the gas entering the absorber.

For the purpose of further discussion it will be more convenient to present the relations defined by equation 24 in graphical form, as shown in diagram 1.

(a) Number of Plates

The diagram illustrates strikingly the importance of an adequate number of plates for efficient extraction. To reduce, for instance, the richness of the discharge gas in any individual gasoline constituent, to 1 per cent of that of the intake gas, the following absorption factors would be required with different numbers of plates:

Number of theoretical plates.....	3	4	6	8	12	16	infinite
Absorption factor	4.2	2.8	1.9	1.56	1.3	1.2	0.99

As the required oil rate and absorber pressure are directly proportional to the absorption factor, it is evident that large savings in plant equipment will result if an adequate number of plates are provided in the absorber. The saving will be very marked up to about 12 theoretical plates, but will be less pronounced from then on. For instance, the reduction in oil rate between eight and 12 plates is about the same as between 16 and an infinite number of plates. *The economical number of theoretical plates will, therefore, lie between rather definite limits. The statement appears justified that it should not be less than* 12 *plates, but that the gain from increasing it beyond* 16 *plates will be relatively insignificant.*

If less efficient extraction is desired the number of plates is of less significance. For instance, if 20 per cent of any individual constituent may be rejected, the absorption factors for six, eight and an infinite number of plates would be 0.88, 0.84 and 0.8 respectively; in other words, little would be gained by going beyond six theoretical plates.

This conclusion is of practical interest only in specific instances, discussed later. For general practice it will be preferable to install a number of plates which will permit efficient extraction without the necessity of using

abnormally high absorption factors, that is, oil rates or absorber pressures.

(b) Plate Efficiency

The number of actual plates required, for instance in a bubble plate absorber, will depend on the plate efficiency. An important problem in that connection will be the relation between plate efficiency and number of plates, that is, whether it is more economical to use a smaller number of plates, of high efficiency and, therefore, elaborate design or a larger number of plates of relatively low efficiency. Fig. 1 permits of a convenient analysis of this problem. Assuming a 16 plate absorber with 62.5 per cent plate efficiency, its performance will be equivalent to an absorber having 10 theoretical plates. It will be evident that a 12 plate absorber would have to have an efficiency of 83.5 per cent to give the same extraction, and that an eight plate absorber, no matter how high its efficiency, could not give the same performance. The effect on extraction can be estimated as follows:

Number of actual plates	20	16	12	8
Assumed plate efficiency	62.5	62.5	83.5	100
Theoretical plates	12.5	10	10	8
Per cent lost for abs. factor.....	1.2	1.9	3.1	3.1	4.8
Per cent lost for abs. factor.....	0.8	21.0	21.9	21.9	23.1

These simple examples are considered sufficient to justify the statement that a 16 plate absorber of moderate plate efficiency will in general give a better performance than more elaborate absorbers having a lower number of plates. For that reason and because of the difficulty in actually determining the plate efficiency, it will be to the advantage of the plant operator, to insist on a *minimum of* 16 *plates* irrespective of absorber design. In exceptional cases, where complete extraction of butanes is desired, it may be economical to use even a larger number of plates.

All further discussion will be based, therefore, on a "standard" absorber, assumed to have 16 plates of 75 per cent plate efficiency, or equivalent to 12 theoretical plates. Extraction of any constituent in *such an absorber will be 99 per cent complete if the absorber is operated with an absorption factor of* 1.30.

(c) Physical Properties of Absorption Oil

The absorption factor has been defined by equation 10 as:

$$A = 3156 \frac{D}{M} \frac{PG}{p}$$

This formula contains the ratio $\frac{D}{M}$ that is, the density of the absorption oil to its molecular weight. Typical values of this ratio for oils of different gravity are as follows:

A.P.I. gravity of absorption oil	32°	34°	36°	38°	40°
Specific gravity D	.865	.855	0.845	0.835	0.825
Molecular weight M.....	192	182	173	164	155
$\frac{100D}{M}$	.450	.466	.488	.508	.532

From this table it will be apparent that the absorption factor is increased approximately 2 per cent for every one degree increase of gravity. The lighter oil will lend itself also to better atomization in the absorber, an effect which will tend to increase the apparent plate efficiency of the absorber.

It will be to advantage, therefore, to use a relatively light oil. It must be remembered, however, that stripping is a phenomenon opposite to that of absorption. The lighter the oil the more difficult it will be to strip it, the more efficient will have to be the stripping equipment, and the higher will, other things equal, be the steam consumption. Only plants equipped with modern stripping equipment will, therefore, derive any benefit from light oil. Other plants will use to advantage a heavier oil, because it is possible to compensate for its lower absorption efficiency by an increased oil rate, while no remedy can be had against losses due to imperfect stripping of the lean oil.

By introducing for $\frac{D}{M}$ the value corresponding to a 38° gravity oil, the formula for the absorption is reduced to the simple form:

$$A = 0016 \frac{PG}{p} \qquad (25)$$

(d) Effect of Temperature

The absorption factor depends on the vapor pressure of the gasoline constituents. The effect of temperature can be illustrated, therefore, by tabulating the vapor pressures of iso-pentane and normal butane for the operating range, that is, between 60°F. and 100°F.

Vapor Pressures of Iso-pentane and Normal Butane

Temperature	Iso-Pentane Lbs. Sq. In.	Iso-Pentane % Increase per 10°F.	Normal Butane Lbs. Sq. In.	Normal Butane % Increase per 10°F.
60°F.	9.6		25.9	
70°F.	11.7	22%	31.2	19%
80°F.	14.1	21%	37.0	19%
90°F.	17.0	21%	44.1	19%
100°F.	20.3	20%	51.9	19%

The vapor pressure of iso-pentane increases approximately 21 per cent, that of normal butane about 19 per cent for every 10 degree rise of temperature. Since the absorption factor is inversely proportionate to vapor pressure, it follows, that the *absorption factor is decreased* 2 *per cent by every one degree rise of temperature.* This is a very important statement.

There are probably many plants in which the lean oil temperature could be reduced at least 10°F. by more adequate cooling facilities. The result would be a 20 per cent increase of absorption factor with a corresponding increase of extraction efficiency. If the extraction is adequate, the oil rate could be reduced 20 per cent with a corresponding reduction of load on pumps, heat exchangers, stills, boilers, condensers, etc. and, therefore, ultimate load on cooling towers.

There is hardy any simple improvement in plant operation which has such a beneficial effect on the whole plant performance as a relatively small decrease in the temperature of the absorption oil. Proper design, maintenance and operation of the cooling towers deserves, therefore, the most careful attention. It is one of the most effective methods of providing additional capacity in overloaded plants.

(e) Effect of Oil Rate and Absorber Pressure

The absorption factor is directly proportional to both oil rate, expressed in gallons per 1000 cubic feet, and to the absolute absorber pressure. The same absorption factor can be obtained, therefore, by any desired combination of pressure and oil rate. By doubling the pressure, the oil rate may be cut into half, etc.

This statement is not exactly true. If the absorption factor is doubled, by increase of pressure alone, the oil rate would remain the same. The increased saturation of the rich oil would cause a corresponding increase of temperature at the bottom of the absorber, which in turn would cause a slight decrease of absorption factor as discussed above.

On the other hand, doubling the absorption factor by maintaining the pressure, but doubling the oil rate, would have the opposite effect on temperature and therefore give a somewhat higher absorption factor than indicated by direct proportions.

It should be remembered, therefore, that allowance must be made for the effect of temperature on the absorption factor, if changes in pressure or oil rate affect the saturation and, therefore, indirectly the absorber temperature. With high pressure plants or very rich gases it may be economical to resort to intercooling of the oil in the absorber to obtain the full benefit of the pressure and oil rate maintained in the plant; in other words, to counteract the large decrease of absorption factor caused by an abnormal temperature rise in the absorber.

(f) The Absorption of Different Gasoline Constituents

The absorption of each gasoline constituent is substantially independent of the absorption of all other constituents. Each will depend on the value of the absorption factor, computed for the particular constituent.

Table No. 1

Vapor Pressure Data

Temperature	PROPANE Lbs. sq. in.	Ratio	ISO-BUTANE Lbs. sq. in.	Ratio	NORM. BUTANE Lbs. sq. in.	Ratio	ISO-PENTANE Lbs. sq. in.	Ratio	PENTANE Lbs. sq. in.	Ratio	HEXANE Lbs. sq. in.	Ratio
50°F.	91	0.23	32.6	0.66	21.3	1.00	7.6	2.8	5.4	3.9	1.5	14.2
60	106	0.24	39.0	0.67	25.9	1.00	9.6	2.7	6.8	3.8	1.9	13.5
70	123	0.25	46.4	0.67	31.2	1.00	11.7	2.7	8.4	3.7	2.5	12.6
80	141	0.26	54.3	0.68	37.0	1.00	14.1	2.6	10.3	3.6	3.1	11.9
90	163	0.27	63.5	0.69	44.1	1.00	17.0	2.6	12.7	3.5	3.9	11.3
100	186	0.28	73.6	0.70	51.9	1.00	20.3	2.5	15.3	3.4	4.9	10.6
110	211	0.29	85.3	0.71	61.0	1.00	24.1	2.5	18.4	3.3	6.0	10.1
120	238	0.30	97.8	0.72	70.5	1.00	28.5	2.5	21.8	3.2	7.4	9.5

Since the vapor pressure is the only physical property affecting the absorption factor, and as the vapor pressures of different constituents differ widely from each other, it follows that the absorption factors for butane, pentane, etc. in any plant operated at a definite pressure, oil rate, temperature, etc. will be inversely proportional to the vapor pressures of these constituents. For that reason the vapor pressure data of the most important gasoline constituents are listed in Table No. 1. They are expressed both by their absolute values,* and by a ratio vapor pressure of butane to vapor pressure of given fraction at the same temperature. This ratio defines at the same time the ratio of absorption factors under any given set of operating conditions.

From this table it will be evident that the absorption factor of any constituent may be expressed as a ratio of the Butane Factor. This ratio depends on the absorber temperature but does not vary appreciably with temperature. For general use it will be convenient if the following figures are committed to memory: The propane absorption factor will in general be 1/4, that of iso-butane 2/3, and that of iso-pentane 2 2/3 times that of normal butane under the same operating conditions (1/4, 2/3, 2 2/3).

In an earlier part of the paper it has been shown that an absorption factor of 1.3 will be required to obtain with a "standard" (16 plate) absorber a 99 per cent extraction of any constituent.

To obtain *efficient iso-pentane extraction* it will be necessary, therefore, to operate the plant with an iso-pentane factor of 1.30, or a *Butane Factor of* 0.50. Since iso-pentane is unquestionably a desirable constituent, this will in general be the lowest Butane factor, at which a plant should be operated. Under these conditions about 50 per cent of the butane content of the rich gas would be extracted.

If a higher butane extraction were desired, for instance 80 per cent of the available butane, the butane factor would have to be raised to slightly above 0.8. In that case the iso-pentane factor would be about 2.1. It will be noted by referring to Diagram 1, that in that case an absorber having eight theoretical plates would extract 99.7 per cent of the available iso-pentane, or be adequate.

On the other hand the oil circulation, to obtain the desired butane extraction, would have to be raised only a few per cent, if the number of theoretical plates were reduced from 12 to eight. This will serve as an example of conditions under which a smaller number of plates may be permissible. Even in this case, however, it could be shown that the small savings due to the larger number of plates will pay for the increased cost of the absorber.

If *complete butane extraction* is desired, the *Butane Factor has to be raised to about* 1.3. The iso-butane factor in that case would be about 0.85, or about 15 per cent of the available iso-butane would be lost. For *complete extraction of iso-butane*, the Butane Factor would have to be *raised to nearly* 2.0.

The value of the Butane Factor of correctly designed plant should lie, therefore, between the extremes of 0.5 and 2.0, and in average practice between 0.60 and 1.30, depending on the desired volatility of the finished gasoline.

Since the propane factor is about one quarter of the Butane Factor it will lie as a rule between 0.15 and 0.30 or 15 to 30 per cent of the available propane will be extracted in the absorber.

(g) Miscellaneous Details

Due to the dependence of the absorption factor on temperature, it is important that the correct temperature be used in the computations. It can be shown that in all cases, where the absorption factor is below unity, the equilibrium at the bottom of the absorber will control. With large factors the top temperature will be more significant. To insure conservative practice it is recommended, however, that the temperature of the oil leaving the absorber be used for routine computations.

The oil rate G is expressed in gallons per 1000 cubic feet. It should be computed, of course, from the volume of gas entering the absorber, that is, the rich gas plus any plant vapors that may be recirculated to absorber intake. Allowance could be made also for the enrichment of the oil in computing the oil rate. This is a refinement, however, that may be neglected in average practice.

Summing up, the best procedure will be to compute the absorption factor from the liquid rate, gas rate and temperature prevailing at the *bottom of the absorber.* Any error introduced thereby will be in the direction of conservative practice, that is, will insure operating conditions which will result in somewhat more efficient extraction than the computations would indicate. In exceptional cases it may be desirable, however, to compute the factor both for the bottom and top of the absorber, to determine the limits between which results may be expected to vary. This applies only to plants in which the enrichment of the oil is high, such as vapor recovery plants or high pressure plants.

2. Effect of Gasoline Contents of Lean Oil

The analysis so far has been based on the assumption that the lean oil entering the absorber is perfectly stripped, that is contains no gasoline fractions. This condition is rarely fulfilled. The effect of the gasoline content of the lean oil on extraction is defined by the second term in equation 18 and may be written:

$$\frac{100Y_1}{Y_o} = \frac{100\,(A^n - 1)\,A}{A^{n+1} - 1} \qquad (25)$$

Y_1 is the gasoline content of the discharge gas; Y_o the gasoline content of a gas in equilibrium with the lean oil containing x_o per cent of gasoline. A is the absorption factor, n the number of theoretical plates.

The relations defined by equation 25 are shown in graphical form in Diagram 2. It will be noted that the gasoline content of the discharge gas approaches equilibrium with the lean oil, as the number of plates and the absorption factor are increased. For absorption factors above 1 and 12 plates equilibrium is fully established, that is $Y_1 = Y_o$.

With reasonably efficient strippers, the lean oil should be substantially free of butane. Its gasoline content should, therefore, consist of fractions for which the above conditions for equilibrium, that is, absorption factor above unity, are fulfilled. It may, therefore, be concluded that the *gasoline content of the lean gas due to imperfect stripping of the oil corresponds to the equilibrium content computed from the gasoline content of the lean oil.*

This equilibrium content may be computed from equation 4:

$$\frac{Y'VP}{1000} = \frac{rx_o p}{100} \qquad (4)$$

The right hand member of this equation represents the vapor pressure p_o of the lean oil due to any one constituent. This relationship may be applied to different constituents as follows:

*Taken from diagram: "Vapor Pressures of Hydrocarbons" for the Natural Gasoline Association of America by G. G. Brown, H. B. Coats, P. A. Badger, Engineering Research Department, University of Michigan, April, 1928.

$$\text{Pentane } Y_{1\,pent} = \frac{1000}{P} \frac{p_{o\,pent}}{V_{pent}}$$

$$\text{Hexane } Y_{1\,hex} = \frac{1000}{P} \frac{p_{o\,hex}}{V_{hex}}$$

No great error will be introduced if an average value of 27.5 is substituted for V_{pent}, V_{hex}, etc. the vapor volume per gallon. In that case the summation of the terms on the left hand side will give the total gasoline content $Y_1 = Y_{1\,pent} + Y_{1\,hex} + \ldots$ of the lean gas, due to the total vapor pressure $p_o = p_{o\,pent} + p_{o\,hex} + \ldots$ . . . . of the lean oil, or

$$Y_1 = \frac{1000}{27.5P} p_o \qquad (26)$$

For general practice it will be preferable to express the vapor pressure of the lean oil in millimeters of mercury, in which case equation 26 may be written

$$Y_1 = 0.7 \frac{h_o}{P} \qquad (27)$$

Y_1 is the gasoline content in gallons per 1000 cubic feet of the discharge gas, due to a vapor pressure of the lean oil amounting to N_o millimeters of mercury at absorber temperature. P is the absorber pressure in pounds per square inch absolute.

The lean oil vapor pressure is, therefore, a convenient criterion of stripper performance and of the losses due to imperfect stripping. The vapor pressure referred to is that of a *gas free* sample. Care must be taken, therefore, to eliminate the effect of dissolved gases, either by applying suitable corrections or by choice of a method which is little affected by the presence of fixed gases.

It will be evident from equation 27 that it will be desirable to maintain N_o as low as possible. This can be accomplished by efficient stripping and by adequate cooling of the lean oil. The effect of temperature particularly can best be illustrated by an example. Assuming that the lean oil be stripped to a vapor pressure of 5 millimeters at 70° F., it would have at 90° F. a vapor pressure of about 8 millimeters. With an absorber pressure of 30 pounds per square inch gage the corresponding richness of the discharge gas would be 0.078 and 0.125 gallon per 1000 cubic feet respectively. The losses due to operating such a plant with lean oil at 90° F. as compared to 70° F. would amount to 0.047 gallons per 1000 cubic feet, or with a plant handling 10,000,000 cubic feet per day to 170,000 gallons of gasoline per year. This example will serve as another illustration of the importance of adequate cooling of the lean oil.

Efficient stripping is less important in high pressure plants. The losses computed in the above example would be reduced from 170,000 gallons to 24,000 gallons per year, if the absorber pressure would be increased to 300 pounds per square inch gage.

Summing up, it may be stated that efficient stripping of the lean oil and adequate cooling have an important effect on the efficiency of extraction. The only partial remedy against inefficient stripping lies in high pressure absorption. It will, therefore, in general be more economical to use an absorption oil of relatively high boiling points which can be stripped effectively in the available steam stills, than to use a lighter oil with inadequate stripping, because an increased oil circulation will compensate for the lower absorption efficiency of the heavier oil while no remedy can be had against inefficient stripping.

3. Selectivity of the Absorption Process

The theoretical analysis presented permits of some definite conclusions as regards the selectivity of the absorption process. With a given number of theoretical plates, the Butane factor to give any desired extraction of butane can be computed from diagram 1, similarly the absorption factors, and, therefore, the percentage extraction of propane and pentane corresponding to the assumed extraction of butane. By repeating the process a diagram can be drawn similar to diagram 3, which graphically illustrates the selectivity of the absorption process.

It will be noted that it would be impossible to obtain complete pentane recovery in a single plate absorber, without also extracting all the available butane and propane. On the other hand with a 16 plate absorber pentane recovery is complete, if only 35 per cent of the available butane is extracted. At the same time only 10 per cent of the available propane content of the gas will be absorbed in the rich oil.

These relations clearly illustrate another advantage of using an adequate number of plates in the absorber: The selectivity of the absorption process is thereby increased and any desirable extraction of valuable constituents can be obtained with a minimum extraction of undesirable ones, and therefore, a reduced load on stills, condensers, cooling towers and rectifying equipment.

4. Conclusions

A mathematical analysis of the absorption process has been presented which permits an evaluation of all important variables entering the problem. The most important conclusions are:

(a) Butane Factor

The effect of the most important variables, namely, pressure, oil rate, temperature and physical properties of absorption oil may be defined by a single term, designated as "Butane Factor." This factor is of such profound significance that it lends itself for a ready comparison of plants of widely different design. If this factor is known, definite conclusions may immediately be drawn as to the possible extraction of different constituents. This factor will serve, therefore, to characterize the type of plant and its size. Its general adoption by the industry would facilitate interchange of information and standardization of practices.

(b) Number of Plates

A minimum number of 16 plates is recommended for standard absorption practice. In special instances it may be found economical to use a larger number of plates. It is shown that an adequate number of plates will in general be more important than a high plate efficiency.

With 16-plate absorbers the Butane Factors for efficient extraction of isobutane, butane, iso-pentane and pentane are approximately 2.0, 1.3, 0.5, 0.35 respectively.

(c) Temperature

The importance of efficient cooling of the absorption oil is pointed out. The Butane factor is increased about 2 per cent for every one degree decrease of the oil temperature. Also the losses due to inefficient stripping of the lean oil are reduced by lowering its temperature.

(d) Gasoline Content of Lean Oil

A formula is presented for computing the losses due to the gasoline content of the lean oil. It is pointed out that with a fixed absorber pressure it is impossible to compensate for inadequate stripping by increasing the oil rate. This conclusion has also an important bearing on the selection of absorption oil. It should primarily have such physical properties as to insure efficient stripping with the equipment available in the plant.

(e) Selectivity of the Absorption Process

A diagram is presented which illustrates the selectivity of the absorption process. It is shown that the selectivity is increased materially by providing an adequate number of plates. Other things equal the selectivity of the process is increased, the lower the temperature at which it is carried out. This effect is not pronounced, however, in the normal operating range.

(f) Application to Practice

The relations presented in this paper are based purely on mathematical analysis, without reference to empirical data. Their value has been demonstrated, however, by their successful application to practice, covering now a period of three years, and the wide variation of operating conditions encountered in over forty gasoline plants. They have been a valuable aid in the design of plants, control of operations and evaluation of test data.

Infant Liquefied Natural Gas Industry Expected to Show Rapid Growth

TULSA, May 17

By John Power
N. P. N. STAFF WRITER

THE distribution of liquefied petroleum gas, welcome step child of the natural gasoline branch of the oil and gas industry, is fast becoming a self contained business. It has a source of supply as unlimited as the supply of natural gas, and a market national in scope geographically, and as yet undetermined industrially.

New uses for the liquid gas fuels are constantly being experimented with, and additional markets being opened up. The principal problem remaining to the young industry is to put itself on a profitable basis, according to those extensively engaged in it in the Mid-Continent. It is still in its adolescent stage, almost grown up, but not yet self supporting. Research and experiment, along with foundation work, have so far eaten into the income derived from the sale of the various types of liquefied gases to such an extent that no overall profits have yet accrued.

That the business of manufacturing and distributing liquefied gases will be an added source of revenue to the companies now engaged in the manufacture of natural gasoline is considered a foregone conclusion. It has been said that every producer of natural gasoline with any pretensions to quantity production has at least considered manufacturing liquid gas, either as a source of supply for a subsidiary company to distribute, or for sale to those now engaged in the distribution of the product.

Many of the companies have not gone beyond the "interested" stage and some have passed up the liquefied gases as fuels to study the production of special cuts for by-product manufacture, and for use of their laboratories studying synthetic products to be derived from the products of the natural gasoline plant.

Domestic installations, in homes too far removed from the gas mains to be serviced in the regular manner, or in towns too small to maintain artificial gas-making plants, occupy a considerable portion of the business done by the distributing companies handling liquid gas. In the public mind, at least, this market was looked upon as the principal one toward which the sales effort would be directed. During the past year or so, however, considerable attention has been paid to the possibilities of the commercial market for liquefied gas fuels. Results so far have demonstrated that this side of the new industry may at least equal in importance the domestic, or individual installation side.

Domestic installations, as practiced by all companies, are essentially alike in principle, although differing somewhat in detail. Cylindrical containers, in which the liquefied gas is bottled under pressure, are installed, and connected with the appliances which the gas is to feed.

Two general sales policies are followed. Some companies maintain complete organizations for the manufacture, distribution, sales work, and account collection. Others operate in a fashion similar to that employed by the automobile manufacturers, and distribute through dealers who own their businesses, and employ their own salesmen, and maintain their own service and account collection departments. These latter look upon the gas manufacturer simply as a source of supply of the product they handle, and for the merchandising assistance commonly rendered by a national distributor to dealers.

The cuts of liquefied petroleum gases in most general use are propane and butane. The pentanes and hexanes are also used, but to a lesser extent. An accompanying table gives the properties of these cuts.

The use of which the fuel is intended governs the choice of the gas used. First comes the domestic fuel, installed in cylinders, and used in individual installations, for which propane is generally used. For industrial uses butane is chosen. This type of installation is used where fuel consumption is large, and where a clean and easily controlled fuel is needed.

Another use to which liquefied petroleum gases are being put is as an enricher for manufactured gas. It is used to carburet producer gas, blue water gas, or other gases of relatively low thermal value. One hundred per cent efficiency in cold carburetion is attained. Butane is also used in this application.

Still another application of the liquid gas is as a base material for manufactured gas. It is used for carbureting gases of little or no calorific value. These latter are used as dilutents, or carrying agents, exhaust, or flue gases or air being the materials most commonly used. Another process along the same line which is being successfully carried out is the reforming, or cracking of high calorific value liquefied petroleum gas vapors to produce low

Properties of Various Grades of Commercial Paraffin Hydrocarbons

	Propane	Butanes	Pentanes	Hexanes
Vapor Pressure lbs. per sq. in. Gauge				
at 70° F.	120	33	9.5 lbs. Abs.	3.0 lbs. Abs.
at 90° F.	165	53	14.3 lbs. Abs	4.4 lbs. Abs.
at 100° F.	195	65	2.6	5.4 lbs. Abs.
at 105° F.	210	71	4.0	6.0 lbs. Abs.
at 130° F.	300	110	14.0	9.7 lbs. Abs.
Temp. at which Pressure is 0 lbs. per sq. in. Gauge, °F.	—44	15	95	150
Specific Gravity of Liquid (Water 1)	.509	.576	.630	.663
A.P.I. Gravity of Liquid, °A.P.I. at 60° F.	146.4	114.2	93.2	82.3
Initial Boiling Point, °F.	—45	12	82	145
Final Boiling Point, °F.	—40	30	100	165
Weight per gal. of Liquid in Pounds	4.24	4.8	5.25	5.5
Mean Coefficient of Thermal Expansion				
From 0°F. to 50°F.	.001316	.000908	.000766	.000764
From 50°F. to 100°F.	.00174	.00118	.000940	.000792
Specific Gravity of Gas (Air 1)	1.523	1.95	2.49	2.97
Specific Heat of Vapor at 60°F. (Cp)	.475	.458	.448	.442
Dew Point at 14.7 lbs. Absolute, °F.	—44	26	90	140
Cu. ft. of Gas per lb. of Liquid	8.49	6.7	5.17	4.21
Cu. ft. of Gas per gal. of Liquid	36	32	27	24
Limits of Inflammability				
Gas per cent in Gas-Air Mixture for Lower Explosive Limit	2.25	2.0	1.5	1.1
Gas per cent in Gas-Air Mixture for Maximum Rate of Flame Propagation	4.7	3.6	2.8	2.0
Gas per cent in Gas-Air Mixture for Upper Explosive Limit	7.4	6.6	5.5	4.2
Maximum Rate of Flame Propagation cm. per sec. in 2.5 cm. diam. tube	82.4	82.5	83.0	83.5
Heating Value				
B.t.u. per cu. ft.	2,550	3,200	4,090	4,830
B.t.u. per lb.	21,650	21,420	21,130	21,010
B.t.u. per gal.	91,800	102,400	110,500	116,000
Latent Heat of Vaporization at Boiling Point				
B.t.u. per lb.	186	170	155	143
B.t.u. per gal.	788	830	811	788

density gaseous fuel of the desired B.t.u. content.

Liquefied petroleum gases are also receiving considerable attention as a source of commercial solvents, and as raw materials for the manufacture of synthetic, or chemical compounds.

The manufacturing process to produce the desired gases is comparatively simple. The volatile condensates extracted by natural gasoline plants contain methane ethane, propane, butane, and the normally liquid hydrocarbons in varying proportions. This raw condensate is charged as a liquid feed to rectifying columns. As each column normally makes but one separation, two products per column generally are produced.

The bottom product comes off as a liquid from the kettle, and the top product is removed as a vapor from the reflux condenser outlet. These products may in turn be passed to other rectifying columns for further separation. Temperature and pressure control allows the separation of the various components present in the natural gasoline.

The apparatus needed for the manufacturing of the special cuts is usually incorporated in the gasoline plant layout of the manufacturer. Inasmuch as the products used in the liquid gases are normally wasted, their use as fuel in liquid form indicates another step forward in the development of the oil industry which will provide a service to the public, and additional revenue to the producers.

So far, the companies engaged in the manufacture of the liquid fuels have combined their production of the several territories in which they may operate. One of them is able to make all of the gases needed at its Burbank, Oklahoma, gasoline plant; another manufactures its supply in the Texas Panhandle. None of the operators feels that its source of supply of the fuel has been even scratched by the present amount of the business being done, encouraging as that may be.

Bulk shipments of the fuel are made in tank car lots. These cars, to conform to Interstate Commerce Regulations, have no bottom outlet. On the dome cover plate are two 2-inch angle valves attached to eduction pipes which extend to sumps in the bottom of the car. These two valves are in the longitudinal center line of the car.

Both the eduction pipes and the vapor vent valve are equipped with weighted check valves which seat upwardly, and close only when the rate of discharge exceeds the maximum for which they are designed, or 3600 gallons of liquid per hour per valve.

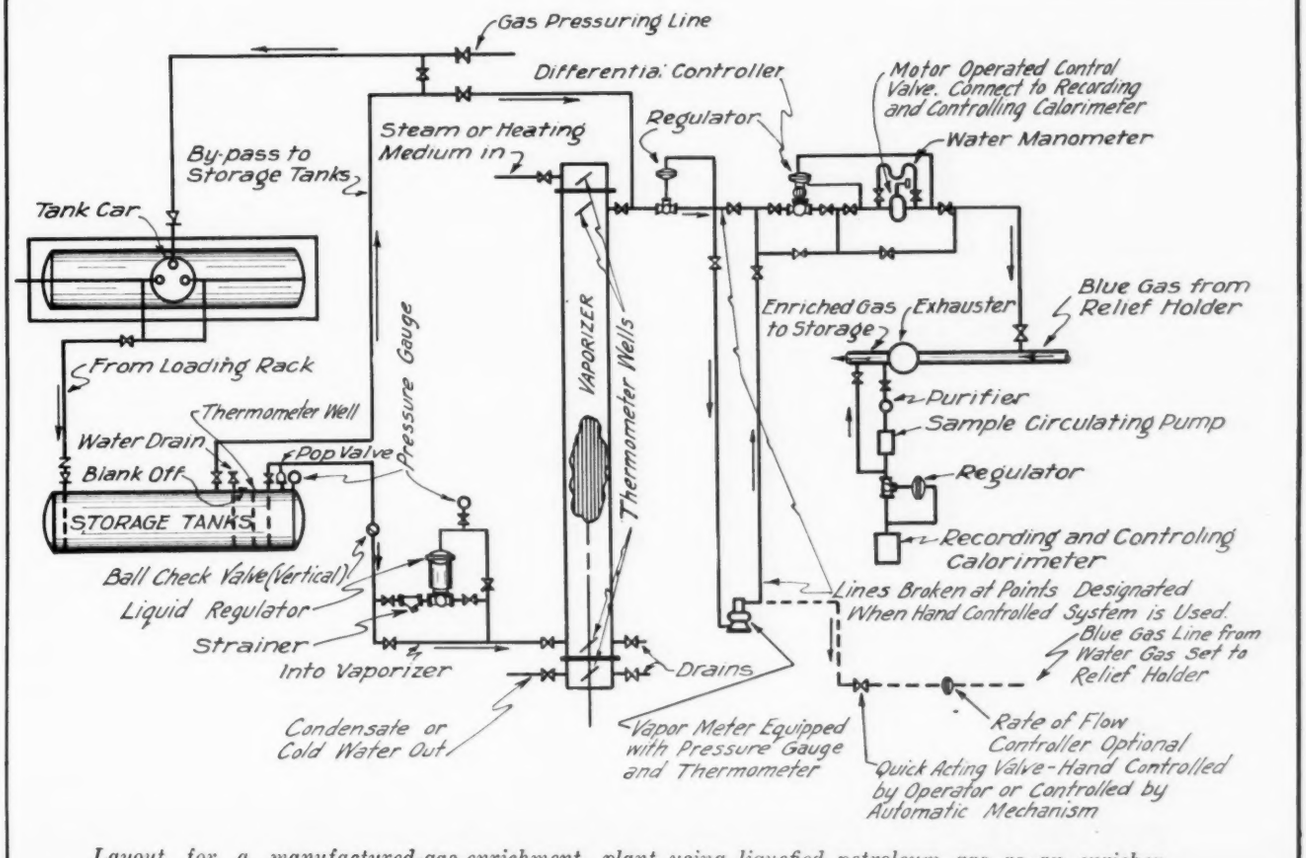
When the tank car arrives at its destination, which may be either a bulk station for the storage of the gas, or at the bottling plant, the gas is removed, and placed in tank storage. The most common method of removing the gas from the tank car is known as the temperature differential method.

The temperature of the contents of the container from which the transfer is to be made is slightly increased, thus raising the vapor pressure on the container. The liquid is either cooled enroute to the receiving tank, or heat is extracted in the tank itself, thus lowering its pressure, and creating a pressure differential which maintains the desired flow.

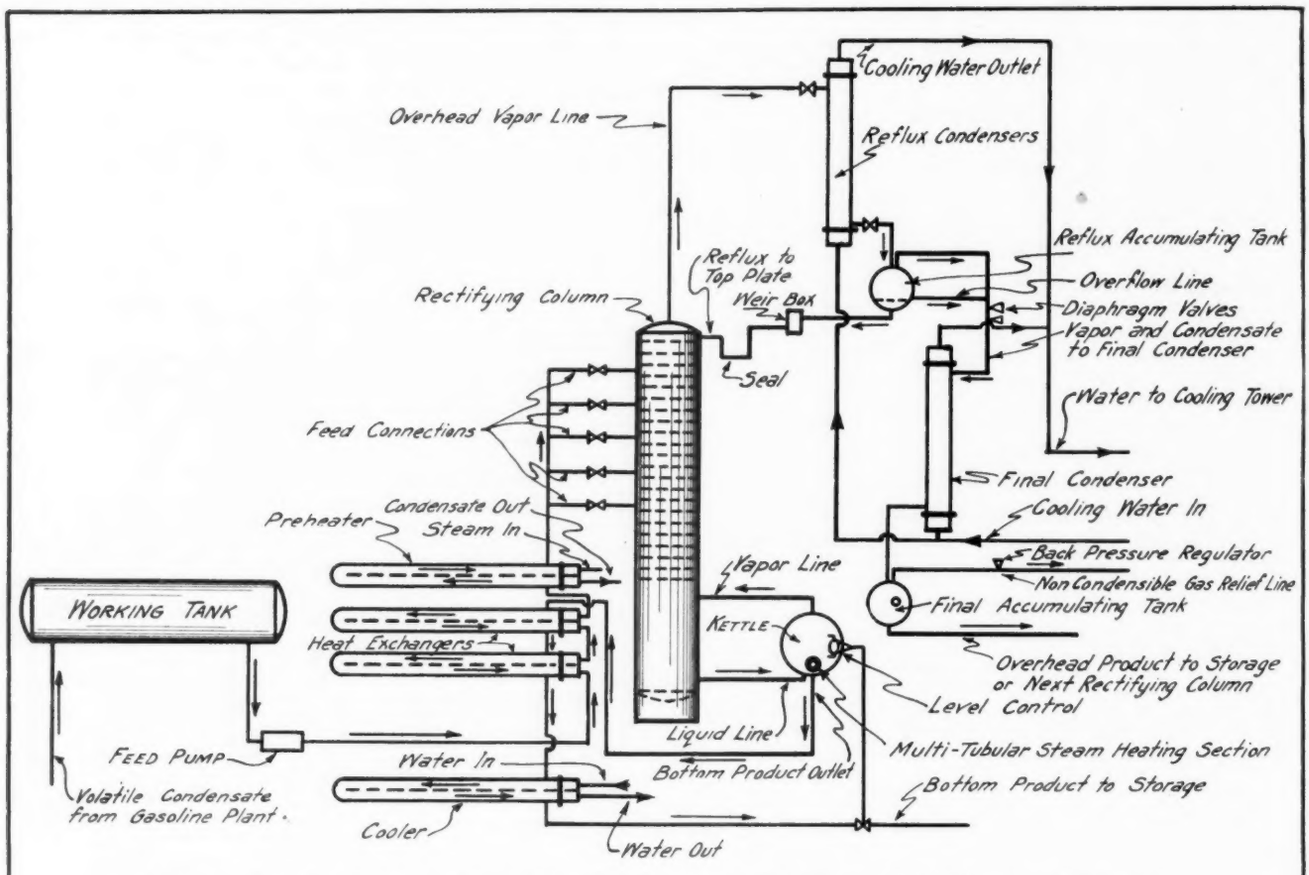
The storage tanks may be either above or below ground, although preferably the former. If underground, precautions must be taken against high ground water levels. A concrete, sand filled pit, equipped with drainage connections has been found to make a satisfactory receptacle for underground storage tanks. The tanks are provided with safety valves set below the tank's safe working pressure.

Of chief interest to the general public is the use of the liquefied gases for domestic, or individual, consumption. This use brings to homes far removed from the gas mains all the advantages of gas fuel. Its simplicity, economy, and cleanliness are the same as that to which the urban housewife is accustomed.

The gas—usually propane—is stored in cylinders holding enough liquefied



Layout for a manufactured-gas-enrichment plant using liquefied petroleum gas as an enricher



Layout of the rectifying apparatus used in the manufacture of liquid petroleum gases

gas under pressure to burn for from 375 to 425 burner hours, using a 4-inch star burner as a measure. One type of installation calls for the placing of two cylinders, and one type for but one.

In the former case the consumer turns on the second cylinder himself when the first one runs dry, calls up the dealer and orders a new cylinder. In the event that he runs out of gas it is his fault, and he knows it, as only the customer's own neglect can make him run completely out of gas.

The other type of domestic installation uses but one cylinder. The distributor's truck, on which is mounted a tank of the liquid gas, calls once a month. The customer's tank is gaged and filled, and the customer sent a monthly bill for amount he has used, as shown by the amount of gas withdrawn from the cylinder since the last filling. This last type of installation removes all responsibility from the customer, both in the operation and maintenance of supply.

So far, most prominent among the commercial uses of liquid gases are those where the gas is used, either to enrich or even generate gas for ultimate domestic consumption. These two uses, together with the use of liquid gas to aid the regular gas supply during times of peak load, are expected to provide the greatest outlet for the liquid gas manufacturer in the future.

In the enrichment process the fuel—butane—is forced by its vapor pressure from the storage tank through a liquid reducing regulator into the vaporizer, where it passes from the liquid to a gaseous state. The latent heat of vaporization is supplied by circulating warm water, or by the condensation of low pressure steam. The vapor leaves the top of the vaporizer through a regulator, and is then metered to determine the amount of enricher used. Carburetion is obtained by passing the gasified butane into the line conducting the blue gas from the relief holder to the storage holder, the point of introduction being on the suction side of the exhauster.

Where the amount of business offered does not make the erection of a gas manufacturing plant attractive because of the high installation and manufacturing costs a process of direct gas manufacture has been worked out. The fact that there are some 200 cities in the United States having a population in excess of 5000 people which are not supplied with gas is ample proof of the potential market of such a use for liquid gas.

In this process the liquid gas—butane again—is transferred to the vaporizer by the same pressure differential method as has been described for the unloading of the tank cars. A liquid regulator is provided in the line to maintain a constant reduced pressure on the liquid in the vaporizer. The vaporizer is constructed quite like a tubular heat exchanger. Water, or steam, is usually passed through the tubes, with the butane in the shell. The latent heat required to vaporize the liquid completely is 830 B.t.u. per gallon. The level at which the latent heat may be supplied to the vaporizer may be as low as 40 or 50 F. An automatic machine proportions air and butane vapor to supply a mixture of any desired calorific value.

There are several methods of using the liquid gases as an aid at peak load times. One such method is by carbureting air or some other inert gas with butane vapors to the required B.t.u. content, and distributing this mixed with the regularly manufactured gas.

That the business is growing, and will some day take its place as a profitable one for those who have the equipment, resources and technical knowledge to take advantage of the conditions as they present themselves is generally accepted. It has been estimated that $10,000,000 worth of new business will be done in the United States in 1930 by those companies now engaged in the manufacture and distribution of liquid petroleum gases.

Natural Gasoline Output at Okla. City To Overbalance Seminole Decline

TULSA, May 10

IN THAT the measures adopted for the curtailment of crude oil production still form the only dam against a flood of natural gasoline, the production situation of this commodity in the Mid-Continent remains little changed since the first of the year. Work under way, and plans for new plants, either tentative or approved, for the Oklahoma City pool indicate that this region will more than offset any decline which can be expected from the Seminole area during the summer.

Production in Seminole, when viewed as a whole, shows little inclination to fall off to any very great extent. Bureau of Mines figures for January of this year give the district's total daily average natural gasoline production as 761,000 gallons per day. A survey by NATIONAL PETROLEUM NEWS of the output for the first of May shows the production to be about 830,000 gallons per day, a gain of 69,000 gallons.

The cold weather of January last, when a great number of oil wells were shut down which normally would feed their casinghead to the plants, had a great deal to do with the reduced amount of gasoline produced. But even giving the cold weather all due credit, or blame, as the point of view may be, it is evident that the Seminole area hasn't fallen off much.

Such additions to the district as Konawa, where several new plants—Carter's, Empire's, etc., are either just getting on production or are building are partly responsible for the lack of decline. Although production from individual plants often shows a decline, it is seldom much, and can generally be accounted for in some fashion other than a permanent lessening of supply. As at Oklahoma City, proration is instantly felt in the volume of natural gasoline production.

The production of the whole state of Oklahoma, exclusive of the Seminole, Osage, and Oklahoma City areas, is doing better than merely holding its own. Examination of Bureau of Mines figures for the first three months of the year shows the January amount produced in areas other than those mentioned to be 594,000 gallons daily average. For March the same figures disclose a production of 623,000 gallons, a gain of 29,000 gallons in the daily averages. The Osage district, which produces in excess of 200,000 gallons daily average, also showed a slight gain, as winter softened into spring.

It is in the Oklahoma City pool that the possibilities of a really large increase lie. So far the limiting of the crude oil production to one sixth of the well's potential, and the time proration method which has been followed have combined to hold back any big plant building program which any or all operators might have contemplated.

However, with the growing unrest among many of the crude oil producers over the drastic fashion in which their oil production is being cut, the possibilities that more wells may soon be thrown open it is plain that the chances for a greatly increased production from this area are greatly enhanced.

As it stands now, there are six operators making natural gasoline in the Oklahoma City pool. They are the Indian Territory Illuminating Oil Co.; the Shell Petroleum Corp.; the Sinclair Oil & Gas Co.; the Coline Oil Co.; the Phillips Petroleum Co.; and the Cromwell-Franklin Oil Co.

The following table gives the total plant capacity of these companies, their gasoline production the first of the year, and at the present time. Proration of crude oil causes day-to-day variations in the gasoline production, but these figures are based on averages over short periods, and cover the present output with fair accuracy.

(Gallons Per Day)

Company	Present Production	Production Jan. 1	Total Plant Capacity
I.T.I.O.	53,000	25,000	100,000
Shell	10,900	8,193	20,000
Sinclair	40,000	25,000	50,000
Coline	8,000	7,500	10,000
Phillips	10,000	.....	75,000*
Cromwell-Franklin	17,000	17,000	20,000

*Partly under construction.

It will be noted that all of the operators are running well below their rated plant capacity. The figures given for the production as of the different dates had to be based on averages as the intermittent gas supply makes it impossible for the plants to operate continuously.

Some of the operators, notably the Indian Territory Illuminating Oil Co., are taking steps to remedy this situation. By May 30 the I.T.I.O. expects to have a greater, and more constant gas supply for its plants, and to step its daily average throughput of gas up, from 92½ million cubic feet, to 145 million cubic feet per day. The gasoline production is expected to increase to 85,000 gallons daily.

The gas supply is being arranged for by manifolding the gas supply system so that when one well is shut in to comply with the proration orders, another can be turned into the system, and the plants kept running.

The Phillips Petroleum Co. also expects to have more gas available by May 15. Phillips expects its gasoline production to climb to 20,000 gallons daily in the Oklahoma City pool before June 1.

Phillips is building another plant in the north end of the field which will be ready in about 60 days, it is thought. This plant will have a capacity of some 30,000 gallons per day. This week the company announced also that it has completed plans for doubling the capacity of its present 50,000,000 cubic foot plant in the south end of the field. This plant will process vapors from stock tanks in the field as well as raw casinghead gas.

There are several other plants now on paper for which ground may be broken in the near future. It is not expected that they will be completed soon enough to take any part in the immediate natural gasoline production of the field.

Should the proration percentages be changed materially as a result of the present agitation which some of the operators are instituting it is possible that a great deal more plant work might be started than is contemplated at the present time. Spurred on by such changes the field's natural gasoline production might easily be sent up to 300,000 gallons per day in the next 60-90 days, and not strain anybody at that.

Statistics for Oklahoma, Kansas, Texas, and California do not indicate that there is to be any great drop anywhere else that will keep the production down to its present level. The accompanying table shows these states' output for the first three months of 1930, contrasted with the same periods for the preceding year.

Month	1930 Daily Average Production in gallons	1929 Daily Average Production in gallons
KANSAS		
Jan.	84,000	100,000
Feb.	106,000	100,000
Mar.	90,000	93,000
OKLAHOMA		
Jan.	1,613,000	1,779,000
Feb.	1,689,000	1,683,000
Mar.	1,726,000	1,839,000
TEXAS		
Jan.	1,200,000	1,007,000
Feb.	1,311,000	1,064,000
Mar.	1,297,000	1,093,000
CALIFORNIA		
Jan.	2,252,000	1,743,000
Feb.	2,461,000	1,834,000
Mar.	2,258,000	2,123,000

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South Earlsboro Pool Gets Extension And County's Second Biggest Well

By William F. Lowe
N. P. N. STAFF WRITER

TULSA, May 17

DESPITE the rain which fell consistently and monotonously in the Mid-Continent during the past week, the area showed considerable activity. Shut down time in some of the flood spots was rather high and the roads everywhere were plenty slow but some interesting wells were brought in just the same. The outstanding hot spot was the new south Earlsboro pool in the Greater Seminole district of Seminole county, Okla. Just as new potentials had been taken and this great producing area had appeared to be on greased skids, the second largest well ever found in the county was brought in. There is nothing to indicate that the new pool will cover much territory but the current completions certainly are impressive.

A number of interesting things happened in the Oklahoma City pool, chief among which was the promise of a mile extension to the west. On the northeast a 7300-foot failure lowered the price of acreage in that area and a rumored oil show in 3-11-2W failed to materialize. Of the 17 completions made, only one reached the 15,000-barrel mark for initials don't seem to be what they used to be. However, the pool averaged over 117,000 barrels a day which is only about 1/15 of its estimated potential.

In Kansas, an operators' pow-wow was held to determine the future proration activities of the Raymond pool of Rice county. Its latest producer, a quarter mile extension to the east, was tested during the week and proved to be as good as those in the discovery area. Drilling restrictions are such that no offsets can be started until June 1, but the Siliceous lime pay is so generous that a new proration schedule seems necessary. In McPherson county, the edge of the Voshell pool was moved one location north, and Reno county has a good looking wildcat.

The Texas Panhandle seemed to be interested primarily in land trading, and gas acreage, especially on the north end of the production trend, changed hands at a brisk pace. Moore county is the most active area, at least from a wildcat standpoint, and several new wells have been started in the promising territory of the northeast quarter.

The accompanying map is one of the new south Earlsboro pool showing the rather spectacular development of the past month. Most of the producers shown have been brought in during that time. The two important ones of the week are the Amerada-Dixie No. 2 J. Grounds, NW NW 23-9-5E and the joint well of the Tulsa Oil Co., Amerada, Dixie and Sinclair, the No. 3 Goss, SE SW NW 24-9-5E. The first of these in its latest gauge shows up as the second largest well to be brought in in the whole of Greater Seminole. The pay was in the Wilcox from 4203 to 4223 and the well flowed 15,235 barrels on its first 24-hour test and is now producing 4065 barrels with a 90-pound back pressure.

One location south on the same lease, the No. 1 well had the same pay slightly higher, from 4188 to 4211, though its best day's yield was but 11,170 barrels on gas lift. Offsetting the larger of these two wells on the west, the No. 2 I. Grounds in 22-9-5E, is making more than 8000 barrels a day on gas lift. This well is the discovery for the new pool and has shown very little decline since it was drilled in some 7 weeks ago. Proration will help the pool and stave off the inevitable rapid decline that is characteristic of the whole area. The present daily production of the south Earlsboro pool is 26,212 barrels from 17 producers, most of which are flowing with gas lift.

THERE is still some speculation as to the size of this new producing area though it is quite generally thought that it is just another pimple on the edge of the older pools. One half mile south of the No. 1 J. Grounds, the Dixie-Amerada combine has a dry hole which seems to indicate that there is not much to be expected in that direction. The Wilcox was found in this well from 4290 to 4301, which is not only lower than in the producing wells, but it contained only lower than in the producing wells, but it contained only salt water.

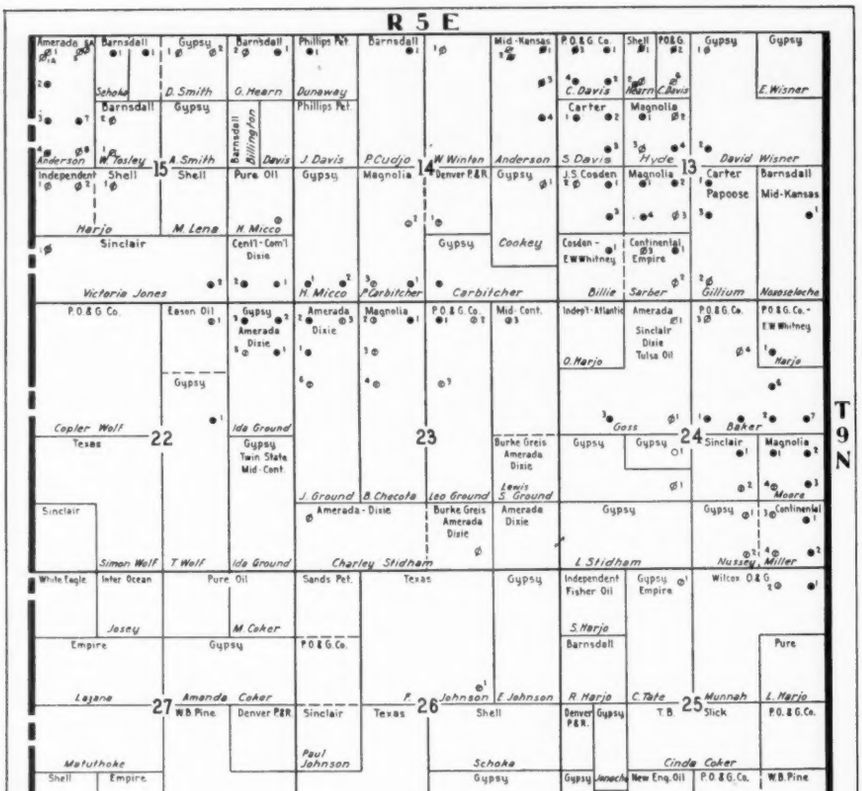
Due east of the pool the No. 3 Goss of the Tulsa Oil Co., offers a little more encouragement. The sand in this well was logged from 4226 to 4237 and an intermittent swabbing test resulted in the tanking of 243 barrels in 12 hours. Like the other oilers in the area it was given a light shot and should prove to be at least a 1000-barrel well on the gas lift. Even its present production makes the eastern extension of the pool look like a certainty though there are several dry holes in the neighborhood. However, the latter have not completely submerged the optimists, of whom there are many, who still think that Earlsboro and Seminole will hook together on the south.

IN THE Oklahoma City pool there were 17 good completions with an average initial to excess of 8000 barrels. The most spectacular of these in point of production was that of the Indian Territory Illuminating Oil Co., in the NE SE SW 1-11-3W. It is a sand well with a total depth of 6510 feet and flowed 12,293 barrels in 20 hours under 120 pounds of back pressure. The most interesting well in the whole field, however, is the Hall-Briscoe No. 1 Holmes, NE SW SE, 10-11-3W, which had a good oil show in a highly saturated sand from 6340 to 6380. It is now drilling at 6420. Should this well prove to be a producer it would extend the pool one mile west and present indications are that it will do just that.

East of the Oklahoma City producing area three and one half miles, the scare of the week came in a rumored oil show in the wildcat of the Ryan Consolidated Oil Corp., in the NE NE NW, 3-11-2W. The Misener sand was found at 6547, the Hunton from 6558 and the latter was reported to be a saturated sand. Had this proven to be the case the well would have upset all the present geology of the area and started no small riot among the land traders.

The lower beds still remain to be tested but since these were found to contain only water in the Mid-Kansas No. 1 C in the SE NE SE 24-11-2W, three miles northeast, the chance for production on the Ryan well do not look so good. The Mid-Kansas well is being abandoned at a total depth of 7375.

The Oklahoma City pool has 228 completed producers of which, under the present proration schedule, about 50 are allowed to produce at one time. The total daily average for the past week from these wells has been over 117,000 barrels. There are



Map of the new south Earlsboro pool of Seminole County, Okla., showing development to date. The No. 2 well of the Dixie-Amerada in NW NW 23-9-5, with an initial of 15,235 barrels is the second largest well to be brought in in the whole of the Greater Seminole area

296 drilling operations, including the current first reports.

In Kansas the east extension to the Raymond pool of Rice county, the Allison-Fitzwilliams No. 1, SW SE NE, 21-20-10W, was tested and made 837 barrels in 10 hours. The pay is in the Siliceous lime. Because of the fact that this area has received but little attention and has but five wells with no pipe line outlet, its true significance does not seem to be generally realized. It is already estimated as being good for over 5000 barrels per day and were it not for the drilling restrictions placed voluntarily on it by the operators, it might very easily go to 20,000 or more.

A Wilcox show is thought to have been found in a rank wildcat of Reno county by the Independent Oil & Gas Co., in SE NW 31-25S-4W. The Viola was cored from 3997 to 4012 and the last foot of this core showed a heavily saturated sand which very closely resembled the Simpson. The well is one that will be carefully watched in the next few weeks.

The Voshell pool of McPherson county was extended one location north with the completion of the Independent Oil & Gas Co., well in SW NW NW, 3-21-3W. The well swabbed 1100 barrels from the Siliceous on its first test. The pool is a tricky one, however, and there were two failures in the proven area. Six others had average initials of over 900 barrels.

Over in the Texas Panhandle interest is chiefly centered about gas acreage and nearly 100,000 acres have changed hands recently. A large portion of these new leases were made in Sherman, Hansford and Moore counties and it is probable that some of them may also be good for oil. Several new wells are being started in the northeast quarter of Moore county most of which are prompted by the showing of the Operators Oil Co., well in Sec. 164-3T-T&NO, and the recent open test of the Morton well in Sec. 191. The latter made 318 barrels of 43 gravity oil and no water.

Texas I. P. A. A. Urges Trust Law Enforcement

By Telegraph

FORT WORTH, Tex., May 18.—Directors of the Independent Petroleum Association of Texas meeting in Fort Worth May 14, adopted a platform urging strict enforcement of federal and state anti-trust laws; hinting that present methods of transporting and marketing crude are inequitable; and taking an unqualified stand in favor of a tariff on crude oil and its products.

Although going on record as favoring prevention of waste in mineral products the association adopted a clause attacking prorating, unitization and permissive agreements for oil development as constituting violation of anti-trust laws. By-laws adopted provide for annual meetings to be held on March 2, except when such date falls on Sunday.

Tom E. Cranfill of Dallas, presided as president. Others present were: Claud C. Wild, executive vice president; Charles L. Morgan, treasurer; J. Marion West of Houston; Luther C. Turman, of Fort Worth; Rupert P. Ricker and J. J. Yowell and Floyd C. Dodson of San Angelo; Leon L. Shield of Coleman; W. F. Fowler, of Dallas, George Calvert, M. S. Ingleright, C. E. Hyde, A. J. Broderick, Stanley A. Thompson, all of Fort Worth.

New directors added to the list and the districts in which they reside or operate follows: District 1—Frank Kirk, Gorman; Floyd Hinson and M. K. Graham, Graham; District 3—R. L. Cook and Tom Coffee, Big Spring; District 4—Bob Cannon, San Angelo; Paul D. Thomas, F. E. Gillette, Sam H. Means, Elpaso, Ike Pryor, Jr., Fort Stockton, and Ken Reagan, Pecos. District 7—Malcolm Towner, A. R. McIlreath and K. C. Baker, San Antonio; District 12—W. F. Fowler, Dallas; Tom Dees, Midlothian; District 13—J. A. Deering and J. Marion West, Houston; H. E. Karnes, Batson; H. J. Lutcher Stark, Orange.

Five directors-at-large were selected. They are Claud C. Wild, Fort Worth; Earl Bell and W. W. Hubbard, Pecos; Philip Maverick and John Imlet, San Angelo.

Exposition to Erect Another Building

TULSA, May 17.—Doubling of the present $100,000 expansion program planned for this year's International Petroleum Exposition has been announced. This was made necessary by reports from W. B. Way, secretary, that all space, including that in the new marketing and refining building has been sold, and that 72 applications for space have been received which present conditions would make it impossible to fill.

A new building, 60 feet by 240 feet, duplicate of the all steel marketing and refinery building which is now nearing completion, is to be erected.

Directors W. G. Skelly, A. W. Leonard, D. D. Wertzberger authorized the additional enlargement program.

ADVERTISING PAGES REMOVED

FOR years Oklahoma City prayed for oil. Parents taught their children to substitute the names of large oil companies for that of the Deity in their bed-time supplications. Geological wise-crackers got ready hearing and publicity by letting it be known that they considered the chances very good for oil production in any direction they cared to name, just so it was close to the City limits.

The wish came true. And now look at the durned thing. It is right at the edge of the city and still going. There is furious competition for town-lot sites. Local enterprisers have staked claims in what formerly was the bed of the North Canadian river and hope to get title under the ancient placer mining law.

Last week a lively battle took place in what was known as Pasadena Heights, a sub-divided tract. One man claimed surface rights to a tract which had been leased by another man to an oil company. The company started to dig cellar on its location. Thereupon the claimant to surface rights drove a car into the excavation so as to halt further work. In the general mix-up that occurred one man was patted in ungentle fashion with a shovel. The "law" finally separated the combatants.

It promises to be a merry summer in the state capital city. One geologist of quite conservative turn of mind has it reasoned out that the field will keep on going north until it reaches the state house, more than two miles north of present production. That would take it right through several high class residential districts. For the good of everybody, including the city's residents, it would be splendid if one of the northerly wells now drilling fails to get production.

The sanest thing that has been done was the refusal of the membership of the Oklahoma City Golf and Country Club to entertain proposals for granting oil and gas leases on their property. Everybody knows there is too much oil and to little golf in this country. One golf course has already been ruined by this Oklahoma City development. It is nothing short of sacrilege.

* * *

George O. Barnard, of the Empire Oil & Refining Co.'s oil production staff at Oil Hill, Kans., has been transferred to the purchasing department at Bartlesville.

* * *

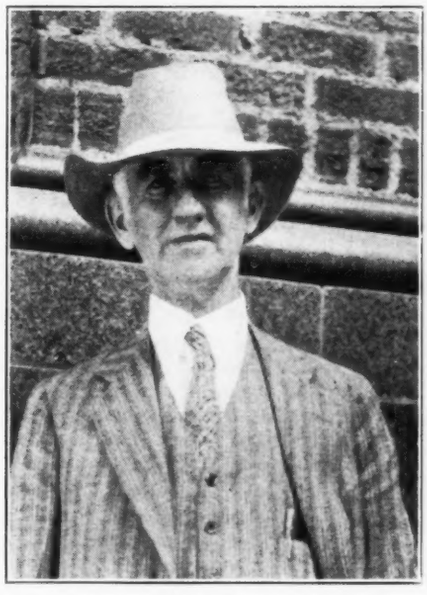
C. L. Swim, safety engineer for the Skelly Oil Co., is assisting the University of Tulsa in Planning a course in safety engineering, to be given as part of the required work in Petroleum engineering.

* * *

V. H. Decker, formerly of the engineering department of the Tidal Oil Co., is now with the Skelly Oil Co. . . . . And Grant Beaty is foreman of the Skelly Hoopes Lease in the Oklahoma City district. He was transferred from the Lovell field.

* * *

C. E. Jackson recently came to Tulsa as assistant superintendent of the Mid-Continent Petroleum Corp.'s automotive division. He was transferred from St. Louis offices.



Homer T. Lamb

president of the Red Bank Oil Co., is of the pioneer era of oil development. The Mid-Continent has claimed his attention for many years and a side trip to Wyoming several seasons ago just about completed his education on territories east of California. The most recent achievement of the Red Bank company was the proving of a new gas field in southeastern Oklahoma

J. A. Welch, formerly an executive of the Gay Oil Co., Little Rock, has been made manager of the Arkansas division (marketing) of the Louisiana Oil Refining Corp. The Gay Oil Co. was absorbed by the Louisiana last October.

* * *

The last of the old Marland subsidiary companies to be changed in name was the Marland Oil Co. of Mexico, S. A., recently renamed the Continental Oil Co. of Mexico, S. A. Headquarters have been moved from Mexico City to Monterrey. P. Messenger is manager of the company.

* * *

O. C. Brewster, for nine years a research engineer for the Standard Oil Co. of Indiana at the Casper, Wyo., plants, has become vice-president and chief engineer of the Refinery Engineers, Inc., at Kansas City.

* * *

John D. Clark, former president of the Midwest Refining Co., will study economic conditions in Russia this summer. Mr. Clark has been doing post graduate work at Johns Hopkins University since he left the oil business. He will become professor of economics in Denver University in 1931.

* * *

Bad news to the oil industry comes from the University of Oklahoma. It is proposed—and it probably is too late to stop it by court proceedings—to offer a course there next fall in oil news reporting. That means that along about 1932 a veritable horde of prying reporters will be turned loose upon the already harassed oil man. There won't be enough jobs for all of them, so several new oil papers will be started. There is only one avenue of escape. That school depends upon the federal government for part of its support. Write to your Congressman today!

* * *

C. M. Taylor has been made assistant purchasing agent of the Indian Territory Illuminating Oil Co., Bartlesville. He was advanced from the position of chief clerk of the department. James Ross was promoted to be chief clerk.

* * *

C. J. Stafford, formerly district geologist in Wichita, Kan, for the Tidal Oil Co., now occupies a similar position with the Darby Petroleum Co.

Thirty Active Operations in Progress In New Playa del Rey Field

By Jack N. Westsmith
N. P. N. STAFF WRITER

LOS ANGELES, May 17

CALIFORNIA operators and engineers have been unable to attend to further development of the state's oil reserves during the past week because of numerous meetings requiring their attention on matters pertaining to reduction of existing crude oil production.

Increased activity was registered during the week at Playa del Rey, southeast of Venice, discovered Dec. 19, 1929 by Ohio Oil Co. There are now 30 active projects in this area, 2 producing, 15 drilling and 13 rigs and locations.

Ohio Oil Co. has a total production of 3040 barrels per day of 24.6 gravity oil from its two producers the Recreation Gun Club No. 1 and No. 2. The discovery well was reopened, after being suspended for over two months, for approximately 1485 barrels of 24 gravity oil and No. 2 an offset to the discovery was initially completed for 1555 barrels of 25.2 gravity oil late last week.

Other projects drilling at critical depths in this area indicate the field will be of very narrow limits although it may extend a considerable distance into the nearby Pacific Ocean. Ohio Oil Co.'s Dickenson No. 2 was reported drilling in extremely tough shale at 5756 feet after having determined the top of the Miocene at 5571 feet.

The company's Howland No. 1, is drilling below 6852 feet in gray schist first penetrated at 6809 feet—this well is now thought to be beyond the productive limits of the field although it is only slightly more than one half a mile from the discovery well.

Union Oil Co.'s Del Rey No. 1 drilled out the cement plug and four feet below the shoe of the 13⅜-inch casing set to 3467 feet, and later swabbed wet with a slight showing of oil and gas. Venice Oil Syndicate picked up the top of the Miocene in its Venice Community No. 1 at 5440 feet and is now drilling ahead below 5621 feet.

To take care of its natural gas production, Ohio Oil Co. is preparing to erect a 5-million cubic foot absorption plant on its holdings near the discovery well. And in line with the construction of this plant a number of independent operators in the Venice field are reported ready to begin construction on a cracking plant to refine their expected heavy crude production.

Major oil companies have been checking old logs of abandoned wells in the Potrero area with the apparent intention of determining the relation of formations in these wells to the projects recently completed for comparatively large production from below the 5000-foot level.

Completed at 3451 feet for an initial production of 1039 barrels of 28 gravity oil, General Petroleum Corp.'s Ferguson No. 2 in the Rincon field on the coast northwest of Ventura Avenue, was reported to have settled down to a steady flow of slightly less than 1000 barrels of clean oil with a tubing pressure of 237 and a casing pressure of 594 pounds.

This enterprise drilled at the end of a 1600-foot pier gave the submarine structure a series of production tests to determine its productiveness. Tests made at levels above the present depth showed the presence of considerable oil and gas but not equal to that obtained from mainland producers. Field reports state the structure was picked up in the tideland well approximately 100 feet higher than on the mainland and the well is considered to have proven the existence of an oil reserve under the ocean in this area.

Further to the northwest, in the Elwood field, Pacific Western Oil Co. encountered water trouble in its Blue Goose No. 3 on tideland permit 93, drilled to a depth of 3989 feet. This is the first tideland well in the Elwood field not to come in with the first swabbing. It is expected with the leak below the shoe cemented off, the project will be brought in, although it is bottomed at a considerable distance below the average producing level for the tideland section of the field.

A deep test of the Ventura Avenue field is underway in Petroleum Securities Co.'s Hartmann No. 2 on the northeast flank of the structure. The well is now drilling below 8034 feet in oil sand but is expected to have to go deeper if commercial production is secured. If this deep test is successfully completed it will extend the Ventura structure approximately half a mile to the north.

Petroleum Securities is also making preparations to start another well on its holdings in the famous Sec. 35, 21, 17, of the north dome of Kettleman Hills. The company completed its Felix well on this section of fee land for an initial production of over 2400 barrels although mechanical difficulties in the hole later reduced the output to its present production of 1500 barrels of 61 gravity oil.

Being on fee land the Felix well was not included in the Kettleman Hills conservation agreement and threatened to nullify the constructive effect of this agreement in the area, as other operators on fee land expressed their intention of drilling out their suspended wells. Standard Oil Co., holding the southern part of this same section completed its No. 38 for

Right of Way Lease Bill Passed by Senate

WASHINGTON, May 19.—The United States Senate has passed a bill, previously acted upon by the House of Representatives, providing for a leasing of lands on a competitive basis under the rights of way, generally of railroads, that were obtained from the United States as base fees or mere easements.

As the measure passed the House of Representatives it would have authorized leases for the extraction of oil and/or gas to the holders of the rights of way. As passed by the Senate it authorizes such leases subject to the provision that when the Secretary of the Interior thinks it consistent with the public interest he may make leases for the development of the ground under the rights of way either to the owner of the right of way or the owner of adjoining lands, whichever makes the better bid for the privilege.

The minimum royalty is to be 12.5 per cent and the lease is to run for 20 years. As explained by Senator Walsh., of Montana, the object of the re-formation of the bill by the Senate was to induce, if possible, competition between the railroad which alone has the right of entry upon the land under the right of way, and adjoining land owners. The bill specifically makes such leases subject to the discretion of the Secretary of Interior as to the identity of the person to do the drilling if he decides some one should do it.

approximately 2100 barrels and Associated Oil Co. is now drilling in oil sand on the down structure side of Sec. 35 at a depth of 6823 feet.

Lease obligations are expected to require Associated to complete its well as soon as possible and is reported to be largely instrumental in Petroleum Securities renewed action on its holdings in this section.

While these companies are drilling ahead, Continental Oil Co. holding government permit land to the east of Sec. 35, is forced to keep the drill suspended until July 31, 1931, under provisions of the existing agreement.

Field	Estimated potential B/D
Santa Fe Springs	209,625
Ventura Avenue	87,830
Elwood	84,540
Maricopa Flats	21,583
Mt. Poso	22,356
Round Mountain	11,526

In a report submitted by the State Fact Finding Committee it was pointed out that pumping wells in the state could supply more than enough oil to satisfy the state's daily crude consumption. These wells throughout the state were reported capable of producing nearly 690,000 barrels per day as compared with a possible production of 417,050 barrels from flowing wells.

The following schedule of potential and allowable production was recently announced by Umpire Grimm for the Group I fields under his supervision; for period May 16-31.

Total potential	Total allotment	Daily average allotment	Present actual prod.
3,354,000	1,643,460	102,716	129,000
1,405,280	735,383	45,961	52,035
1,352,640	799,792	48,737	44,117
345,328	184,474	11,530	13,425
357,696	186,968	11,685	10,223
184,416	96,413	6,026	4,776

The allotted figures shown above are practically all below the actual production from the fields in question and were made below previous allowables so that strict compliance with the provisions of this report would reduce the state's output to the desired level of 596,000 barrels.

Oklahoma City Drilling Campaign Totals Nearly 300 Operations

TULSA, May 17

FOLLOWING the big campaign of starting new work in the Oklahoma City pool of the past month, further pushing of drilling in advance of production will not move so rapidly until new territory is proved.

Much conversation has been indulged in the past few days to the effect that the peak of potential production in this field has been passed. That is, production to come from new wells from now on will not offset the decline in wells now completed. There is some evidence in that direction, but it cannot be called conclusive. On a field that has a potential rating of around one million barrels and produces a little more than one tenth of that, it is quite impossible to figure such intangibles as "decline in potential" and be at all positive about it.

Of more practical interest right now is the attitude that will be taken by some of the town-lot operators when they reach production. It is reported that some of them have asserted that they are not interested in proration, that when their wells come in they propose to sell all the oil they can regardless of what others think is the sensible thing to do.

There are only a few of such wells that are nearing completion date. One or two are down where 30 or 40 days will find them in the producing class if the delays in completion practiced by others are ignored. One of the town-lot promoters is understood to be considering plans for laying a short pipe line to railroad and shipping his oil in tank cars. And, in trade circles here, it is said that one has offered his production, when he gets it, to one of the major buyers at a price considerably under the market.

Of course, if there is an attempt to produce in violation of the corporation, commission's orders under which the field is prorated, there will be no course for those companies that are trying to hold the situation in line to take except to go into court and enforce the order.

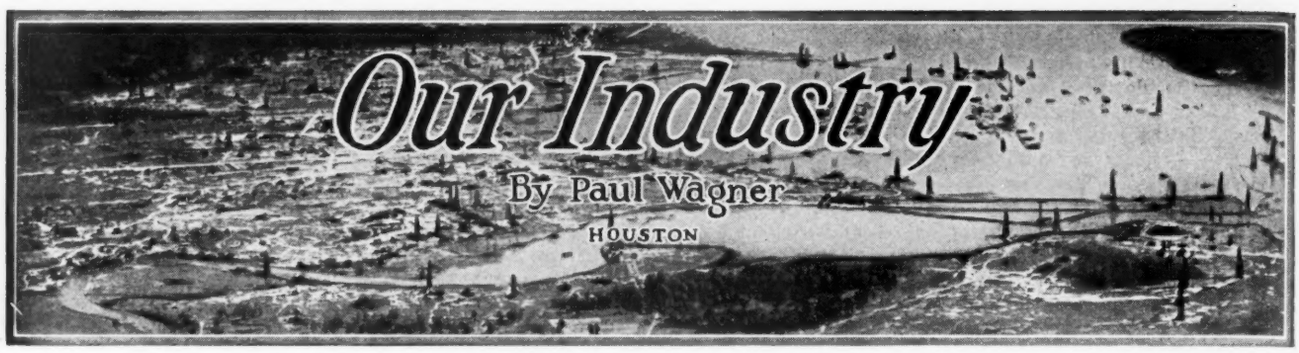
The field now has a total of 296 operations. Late last fall it seemed as though the middle of this summer would find most of the drilling finished. Then extensions, both on the north and the south, brought on the second wave of drilling and another has come within the past month. Evidence of this last spurt is seen in the accompanying table, showing 79 wells classed as rigs and locations —work just starting. Not all of these have advanced beyond the location class yet, but all will be active within a few days.

Many new faces have appeared in this field since the first crop of wells was started. Originally the only people who participated in the development were the Indian Territory Illuminating Oil Co. and Foster Petroleum Co., whose joint holdings were recently merged; The Coline Oil Co., Mid-Kansas Oil & Gas Co., Prairie Oil & Gas Co., T. B. Slick, Inc., Shell Petroleum Corp., Sinclair Oil & Gas Co., Cromwell-Franklin Oil Co., Wirt Franklin Petroleum Corp., Amerada Petroleum Corp. Latterly, larger companies that have come in are Skelly Oil Co., Phillips Petroleum Co., Continental Oil Co., Anderson-Prichard Oil Corp. and a host of smaller ones.

The following table shows the status of drilling operations as of May 15. What with the 70 wells drilling below 6000 feet—pay is found at 6300 feet and deeper—and 93 that are between 4000 and 6000 feet, there will be a steady run of completions through the summer.

Status of Oklahoma City Pool Drilling Operations as of May 15

Company	Rigs and Locations	Less than 2000 ft.	2000 to 4000 ft.	4000 to 6000 ft.	Below 6000 ft.	Total
I.T.I.O.	18	7	11	37	32	105
I.T.I.O. & Cromwell-Franklin	3	....	....	3	2	8
I.T.I.O. et al	1	1	....	1	4	7
Cromwell-Franklin & I.T.I.O.	....	....	3	5	6	14
Hall-Briscoe	3	....	1	....	....	4
Wirt Franklin	6	....	6	2	5	19
Jack Shaffer et al	....	....	....	....	1	1
Weston & Krug	1	....	....	....	....	1
Capitol Prod.	1	....	....	....	....	1
Century Pet.	1	....	....	1	....	2
Coline Oil	3	....	1	7	7	18
Sinclair	2	....	5	26	....	33
Sinclair-Amerada	....	....	....	....	1	1
Skelly Oil	2	....	....	....	2	4
Wrightman Pet.	....	....	....	1	....	1
Quinn Bros.	1	....	....	....	....	1
Heenan & Coe	....	....	....	....	1	1
Jas. McMahon	1	....	....	....	....	1
Mid-Texas	....	....	....	....	1	1
Champlin Ref.	1	....	....	....	....	1
Phillips & Anderson-Prichard	....	....	1	....	....	1
Phillips Pet.	1	....	1	....	....	2
Reynolds & Unruh	....	....	....	1	....	1
Taylor & Alexander	1	....	....	....	....	1
Jones Bros.	....	....	1	....	....	1
V. A. Kedney	1	....	....	....	....	1
H. B. Van Hooser	1	....	....	....	....	1
Slick & Atkinson	6	3	4	2	1	16
Marco Oil	....	....	1	....	....	1
Prairie O. & G.	....	1	1	....	....	2
Julian O. & R.	1	....	1	....	....	2
S. M. Stauffer	1	....	....	....	....	1
Oil, Inc.	1	....	....	....	....	1
T. B. Slick	3	....	1	3	2	9
Slick & Anderson-Prichard	....	....	....	....	3	3
Prairie & Slick	4	....	2	2	1	9
Mid-Kansas	1	....	....	....	1	2
Anderson-Prichard	7	....	....	....	....	7
Indian State	3	....	....	....	....	3
T. F. Noonan	1	....	....	....	....	1
Continental	2	....	2	2	....	6
Plains Pet.	1	....	....	....	....	1
	79	12	42	93	70	296



R. J. DeLONG has been appointed manager of lubricating sales, Louisiana division, of the Louisiana Oil Refining Corp., Shreveport. He succeeded Fred J. Mechlin, who resigned to enter business for himself. Mr. DeLong takes to his new position the background of 17 years in the industrial lubrication field, most recently as the assistant manager of lubricant sales for the Pierce Petroleum Corp., at St. Louis. Previously he was identified with the Marland Refining Co.

* * *

Adjustments in the Gulf Coastal scouting department of the Pure Oil Co. have been made by transferring B. C. Selden from Houston to Corpus Christi, E. M. Pinckard from Beaumont to Houston and Don K. Taylor from Lufkin to Lake Charles.

* * *

Laurie Scott is now scouting southwest Texas territory for the Southern Crude Oil Purchasing Co., arm of the Pan American Petroleum & Transport Co., from his new headquarters at San Antonio. He was transferred from Midland, where "Buddie" Hall, formerly of Fort Stockton, succeeded him.

* * *

O. C. Wheeler, who has been spending a vacation in the United States, is a member of the geological staff of the International Petroleum Co., subsidiary of Imperial Oil, Ltd., in the Colombia, South America, region. While in this country he attended the March meeting of the American Association of Petroleum Geologists at New Orleans.

O. C. Wheeler

* * *

Joe Ellis is now making Dallas headquarters for his work in the sales department of Humble Oil & Refining Co., Houston. He was formerly a production scout in Texas field territory.

* * *

Jack Watt is now scouting Jackson, Mississippi, territory for the Lion Oil & Refining Co., El Dorado, Arkansas. He was recently transferred from Tyler, in the East Texas region.

* * *

Paul Williams has taken up his new activities in charge of Gulf Coastal petroleum engineering work of the Pure Oil Co., working in the Houston district under the Texas division chief, R. B. Kelly, of Fort Worth. Mr. Williams was transferred to Houston from Tulsa.

* * *

W. L. Childs, vice president and general manager of the Reed Roller Bit Co., was recently appointed a member of the itinerary committee of the Houston Chamber of Commerce. The committee is working on the itinerary of a 5700-mile industrial tour of the United States to be made by Houston business men.

* * *

Z. Birdwell, formerly in charge of the Pure Oil Co's. field operations at Welsh, Louisiana, has been transferred to High Island, Galveston county, Texas, where other tests will be drilled.

* * *

Arizona capital is back of the Western Plains Oil Co., Joseph Olsen president, which is making a wildcat test in Tulare county, California. Other officers of the company are C. W. Boxer, vice president and general manager, and J. J. Stephens superintendent.

* * *

Errol J. Hesser has succeeded C. C. Hummer as district superintendent of production of the Pure Oil Co., in Gulf Coastal Texas territory. Mr. Hummer is now in West Texas.

* * *

C. R. Wolf, formerly in charge of the Louisiana Oil Refining Corp's. land department at Shreveport, now has a broader field as office manager of the newly created real estate department.

* * *

F. N. Rumbley is Los Angeles representative of the Seaboard Midland Petroleum Corp., of Baltimore, which has entered California as a purchaser of gasoline for Atlantic Seaboard movement.

* * *

S. E. Towery, formerly manager of the Louisiana Oil Refining Corp's. Arkansas marketing division, has been placed in charge of the newly created real estate department. He makes headquarters at Shreveport, handling sales, leases, options and rentals to the end that unproductive properties shall be eliminated as such. J. A. Welch has succeeded Mr. Towery as manager of the Arkansas division. J. D. Flynn succeeded Mr. Welch as assistant manager.

* * *

R. B. Swiger, widely known geologist in the San Antonio territory, is associated with the Trinity Drillers, Inc., operating at Darst Creek, in the Luling fault zone. Mr. Swiger is a member of the American Association of Petroleum Geologists.

R. B. Swiger

Eight fast trucks and eight six-wheel trailers in this fleet of Petroleum Transportation Company, Seattle, are all on 38 x 9.75 Goodyear Balloons.

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GOODYEAR

ON YOUR NEW TRUCKS SPECIFY GOODYEARS

Van Field Builds Up High Potential As Pipeline Building Proceeds

By Paul Wagner
N. P. N. STAFF WRITER

HOUSTON, May 16.

WORK is forging ahead rapidly on the 210-mile system of the Pure-Van Pipe Line Co., that later this summer is to connect the Van field of Van Zandt county, East Texas, with a tidewater outlet for crude at Smiths Bluff, in the Port Arthur-Beaumont district.

Nearly half of the 10-inch line, which will have capacity of 30,000 to 36,000 barrels daily, has been welded; and completion is expected not later than July 1.

The system will provide crude outlet for the Van field unit companies through the Pure Oil Co's Smiths Bluff refinery until such time as the Pure's exclusive marketing rights to oil from the area expire at the end of 1930. Thereafter, short pipelines connecting with the East Texas systems of the Humble Pipeline Co., and The Texas Pipe Line Co., may be constructed in line with later requirements.

For the present, the more than 20,000 barrels of crude produced daily under the unified development contract covering Van field operations moves through a short pipeline to Chandler, where it is loaded in tank cars billed to the Smiths Bluff refinery. The short pipeline will form a gathering link in the main system when it is completed later in the year.

More than 80 per cent of the Van field production belongs to the Pure Oil Co., which drilled the Jarman discovery well and first turned it into field tankage, Oct. 14, 1929[1], making 1600 barrels initial flow from the 2710 foot woodbine level. A higher maximum rating was attained later, but the discovery well, in common with subsequent completions, was produced from the first through small chokers.

The discovery well was estimated good originally for 3500 barrels daily in the most conservative circles, and by some authorities was rated as capable of giving up twice that initial yield. With the exception of three or four completions believed to be edge wells of the field, subsequent completions have been generally rated good for 4000 to 10,000 barrels, initial production.

The 38 wells producing at the time this was written were rated at combined potential production exceeding 150,000 barrels daily, notwithstanding that the maximum exploitation for any single day in the history of the field has been less than 30,000 barrels. Because of the choked character of the wells no adequate test of their capabilities has ever been made.

Little detailed information is available on week-to-week completions in the field, because the Van unit companies have closed down on scouting information in the period of adjustment of title grief now apparent in the territory.

Title troubles are further complicated by the existence in the structurally proved area of excess surveys, on which efforts have been made to file by individuals and others not among the original lessees.

Early in the history of the field, Fort Worth interests who threatened to break up the unified development plan because of their ownership of three acres adjacent to the Van townsite were bought out by the major companies subscribing to unified development for a sum reaching into six figures.

More recently, in April, T. E. Cranfill and associates of Dallas sold a 100 x 600 foot excess strip in the south part of the Walling Survey to the Van unit companies for a substantial sum, thereby removing another thorn from the side of the co-operative development program.

Unified operations are described as continually under a strain in the Van field, with many additional leases affected by offset requirements in addition to the complications brought about by excess survey conditions.

Work is going ahead, however, in a program to drill at least one well for every fee land owner within the structural limits of the field; and it is the program, further to eventually develop the area with at least one well to every 40 acres.

When the field was brought in last October, lease terms had run to the extent it was soon realized that more than 100 wells would have to be drilled in 15 months to fulfill the provisions of leaseholds. With more than a third of that time already elapsed the wells completed and the tests under way constitute only about half the program necessary to be completed by the end of 1930.

About 20 rigs are kept operating continuously and the end of June will find 60 or more wells completed in the Van area. Rotary outfits are used exclusively at Van by the Pure Oil Co., which has operating management of the field under the unified development contract it has with The Texas Co., the Sun Oil Co., Humble Oil & Refining Co., and Shell Petroleum Corp., owners of the acreage not originally taken up by the Pure.

Together, the companies mentioned own between 15 and 20 per cent of the oil produced in the field as compared with the Pure's ownership of more than 80 per cent. Their share of the production now takes a price adjustment about 20 cents a barrel below the Mid-Continent gravity scale in connection with present tank car marketing arrangements.

The field is soon to have a natural gas gasoline plant with 12,500,000 cubic feet daily capacity, according to announcement of the Pure Oil Co., which will operate it under the unit arrangement with other lease owners. Gas produced in the field is described as unusually rich, although no recovery figures have been issued.

A short line railroad under construction from Grand Saline, on the Texas & Pacific system, to Van, will connect the unit properties with the outside world when completed. It will be 10 miles long and will provide lower cost transportation than now possible through trucking practice.

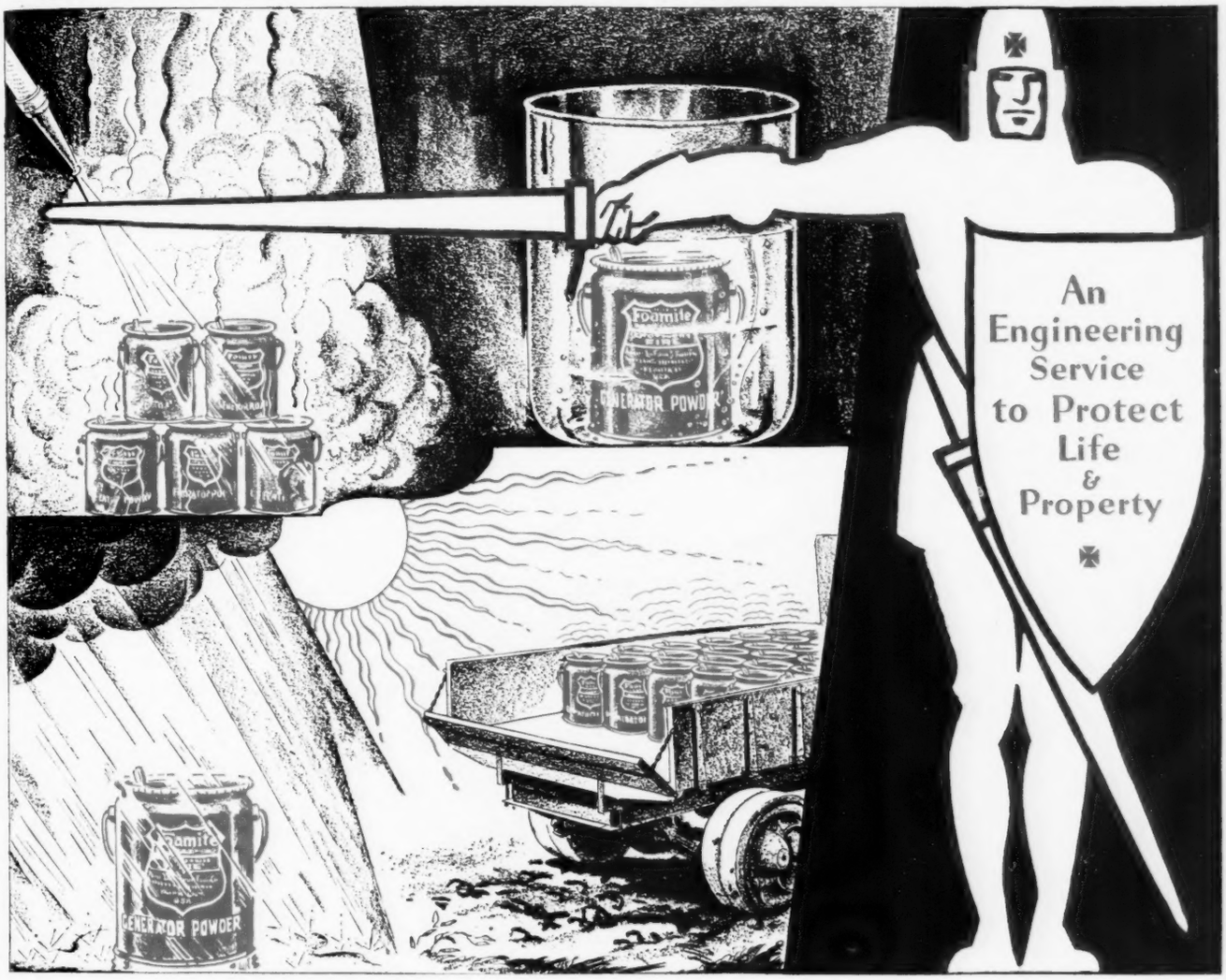
Various estimates have been made of the ultimate yield value of the field, but in the absence of the opening of wells beyond their small choke capacities—and in the absence also of decline data, which obviously cannot be tied down—these are at best guesses. A conservative estimate is that the field will approximate 2000 acres of productive ground, averaging 40,000 barrels of crude oil to the acre.

The figures mentioned would give the field an ultimate recovery of 80,000,000 barrels, which is generally regarded as conservative rather than otherwise. It is recognized that the field may extend into a larger area than mentioned, also that leaseholds on the top of the structure will show higher recoveries. The figure mentioned, however, allows for an average of all acreage, whether on top of or adjoining the edge of the structure.

Doubt is now being expressed that the field can be held to the low average exploitation of 25,000 barrels daily that was originally forecast for the development area, but it is not believed that production will exceed 40,000 barrels daily this year, notwithstanding the potentials to be built up by the drilling of more than a hundred wells.

[1] National Petroleum News Oct. 16, 1929.

FIRE — AN INCIDENT OR A DISASTER ?



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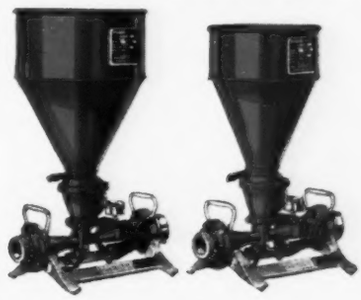

LA FRANCE AND FOAMITE PROTECTION

AN ENGINEERING SERVICE

AGAINST FIRE

Novel Attack on Sand Cutting Tried at Oklahoma City

Staff Special

OKLAHOMA CITY, May 15

THE big wells of the Oklahoma City pool carry so much sand with the fluid they produce that operators have difficulty in finding fittings to hold them. Special heat treated alloy steel nipples have been cut through in less than an hour's time and heavy steel blocks have been equally ineffective. So difficult has it been to produce some of these wells that many experiments have been made to solve the sandcutting problem. The accompanying photograph illustrates an effort of Skelly Oil Co., engineers to meet a difficult situation.

The new device, which is really an expansion chamber, was made by the National Tank Co., and consists of a shell of a 3 by 15 separator of 500 pounds working pressure. It was flanged to the top of the casing above the master gates and has two 8-inch openings to the traps. When the well was first opened a slug of mud ripped out a defective bull plug at the top but caused no other damage and the initial test of the well was successfully made. The theory of this new method of producing sand-cutting wells, that of causing the fluid to cushion against itself, is ideal, and other operators are closely watching the experiment.

The well on which this flow head was placed is the Skelly No. 4 Hoopes, 31-11-2W. A new producer, it flowed at a rate in excess of 12,000 on its first test. It is making about 50,000,000 cubic feet of gas and has a shut-in pressure of 2000 pounds.

Separator set over well to cause cushioning of flow and reduce sand cutting of fittings

New Features of Oil Well's Steam Slush Pump

CLEVELAND—Oil Well Supply Co., Oil City, has incorporated three new distinctive features into its new Imperial No. 20, 15 by 7¾ by 20-inch steam slush pump, namely automatic lubrication, a new type liner spacer and direct fluid flow.

The new type liner spacer eliminates all bolt adjustments through the cylinder head and permits the water piston to be removed without disturbing the liner, and also eliminates the necessity of packing and adjusting set screws each time the piston or the fluid head is removed for any purpose.

The proper amount of lubricant is continuously distributed at the right time by a special automatic lubrication to all working parts. Built-in oil passages insure the feeding of clean, fresh oil by keeping out mud and dirt.

The fluid end, tested hydrostatically to 3000 pounds, has the principle of direct flow in which the friction and travel of the fluid passing through the large unrestricted passages of the fluid end are reduced to a minimum.

Extra large valve openings reduce the velocity of flow through the valves. The new pump consists of three principal castings, fluid end, steam end and air chamber, making assembly and maintenance of permanent alignment a simple matter. Steam end is designed for 350 pounds pressure.

WASHINGTON—The Anglo-Persian Oil Co. in 1929 produced 42,000,000 barrels of crude oil in Persia, an increase of 3,500,000 barrels over the high production record of 1928, according to the Bureau of Foreign and Domestic Commerce.

Economies in Old Lease Operation Made with Jacks and Junk

By William F. Lowe
N. P. N. STAFF WRITER

DRUMRIGHT

ATTENTION of the oil industry, from a production standpoint, centers largely about spectacular developments. New pools, new ways and places to drill seem much more interesting news items than the prosaic pumping of old leases. It is natural for there is a glamour about new pools suggesting boom days and boom towns. All the romance of the oil country is in the rotary's grind and the jar of the beam, but it is the swing of the jack and the rod line's jerk that puts the backbone in an annual statement.

A realization of this fact made big companies bigger. The methods of profitably keeping the oil coming after the flush is gone, even when the average production per well is less than 10 barrels, are more than interesting. They are vital. Most of the old pools of the Mid-Continent have reached the halfway stage in their development, where lifting costs demand either new production methods or abandonment. If properly handled, many of the small leases could have several years added to their paying life. In the old Cushing and Drumright fields there are many illustrations of how this has been done and of these, the Mary Gooden lease of the Continental Oil Co., in the latter area, is a striking example.

Located in the NW SE of 16-17-7E, Creek county, the 40-acre lease was originally drilled in 1914 and 1915 by the Sapulpa Refining Co. Five of its 13 wells are bottomed in the Bartlesville sand at an average depth of 2700 feet. Four others are in the Skinner at 2400 feet and three were drilled to the Layton at 1600, though one of these has since been plugged. From the present total of 12 wells the lease is averaging about 50 barrels a day.

This is not an impressive figure and the fact that the lease is still a paying proposition is due to the economical way in which it is handled. It was taken over by the Continental Oil Co., in 1924 when all the wells were being pumped by individual gas engines. As production declined it was found that that method was too expensive and a central power was installed to operate pumping jacks on all the wells.

Fig. 1—View of power from top of hill over which the rod lines were stretched. Note number of hold-downs necessitated by valley position of the power and the general orderliness of the lease

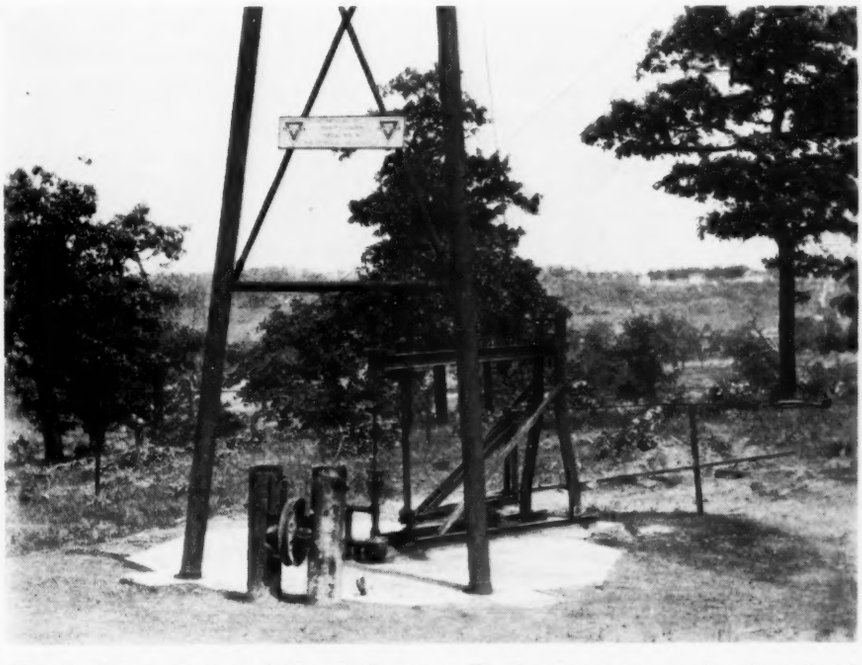

Fig. 2—Setup at one of the shallower wells showing home made gin pole of junk 6-inch casing. Note shape of floor and cleanliness of location

The topograph of the lease made this anything but a simple matter. The center is a valley between two sharply inclined hills of approximately 75 feet in height. Most of the wells are on the crests of these hills though some of them are on the far side away from, and out of sight of, the power. Considerable grading was necessary in the valley to make room for the power, and the stretching of rod lines to the wells required plenty of ingenuity.

In two cases, where the horizontal distance to wells was only 500 feet, it was necessary to use 700 feet of rod line to go over the hill to reach them. The power unit consists of a

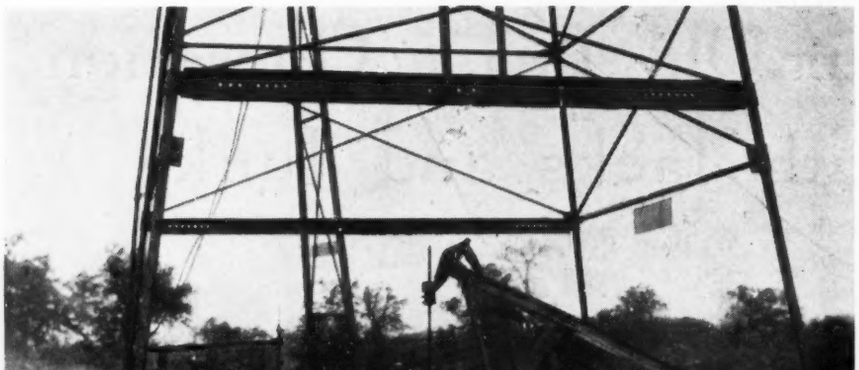

Fig. 3—Close-up of concrete floor showing junk 6-inch pipe as curbs. Note rod rack which serves both wells, and detail of pulling sheave

40 horsepower, four-cycle Superior gas engine which pulls a 15-inch belt on a 24-foot Reid roller bearing band wheel power.

Wherever it was possible to do so, junk equipment was used in all the lease work. The rod lines were made up of old 25-foot sucker rods and welded six-inch casing answers for gin poles over the shallower wells. Only standard essential fittings of rodline equipment, such as hold-downs and swings, were purchased outright. When it is remembered that the power occupies the only level spot on the lease it is quite evident that a good many of these were needed. Several may be seen in Fig. 1.

The bolts for these fittings, however, were all turned out by a roustabout on the job. They were made from old heat treated sucker rods which were hacksawed into the proper lengths and headed and threaded in the small lease shop. One man could turn out $15 worth of them in a day without any undue exertion and a considerable saving resulted.

The changes made in the setup at the wells were moves toward convenience as well as cleanliness. The old wooden derricks were torn down and the ground around the well head fittings was smoothed out evenly on all sides. A foundation for a concrete floor was made with broken rock which was plentiful on the lease. Serving as a retaining wall between the corners of the rig, were pieces of junk six-inch casing which added considerable strength to the floor edges. Each floor required about 25 sacks of cement and five yards of sand.

As may be seen in the illustrations, the floors slope toward the center where old 10-inch casing is set as a drain to the side of the derricks. Lead lines and casing head gas lines are also run through these drains. The jacks are all held firmly in place by bolts set deeply in the concrete floor though they may easily be removed during pulling operations.

On the side of each floor and set in four feet of concrete independent of it, are the pulling sheaves. Here again, junk is made to pay dividends. The uprights are old pieces of 10-inch casing in which discarded Sampson post side irons are set and bolted in an upside down position. See Fig. 2. The sheaves are part of old crown sets. A number of advantages are claimed for this pulling arrangement and most of them are obvious. There is no question about their being strong and safe and, being short, they give the tractor operator a clear vision of the floor, thus reducing accidents.

With all this equipment in place the overhead expense of running the lease was cut considerably and lifting costs moved down accordingly. So efficient is the complete installation that, aside from pulling jobs, but one man is required for its operation. Shutdown time due to breakdown has been largely eliminated with the removal of the old engines from individual wells and the production increased from 40 barrels to 50 barrels a day. This increase is traceable directly to the efficiency of the new setup and is doubly interesting considering the fact that one well was plugged and the property is 15 years old.

Though not usually considered a means toward the lowering of production costs, the thorough cleaning up of this lease is evidence that it really pays. The substitution of steel and concrete for wood greatly reduced the fire hazard and lowered the insurance rates. The same is true of the extraneous material that clutters the average oil property. By collecting and sorting the junk and bringing about some semblance of order and cleanliness, the lease not only looks better but becomes a place where system has a good chance of success.

For the most part, the expense of making these changes has been offset by savings in the operating costs. In a short time they will be completely paid out and there is no question about the extension of the productive life of the lease.

Shows Production Savings With Nickel Strainers

NEW YORK, May 14.—How oil well strainers made of nickel effect savings through the corrosion resisting elements of nickel, is told by Stanley Gill, research department, Gulf Oil companies, in a recent issue of the Inco magazine published by the International Nickel Co., Inc., 67 Wall St.

Among various tests made of other metals and alloys for oil well strainers Mr. Gill says in part:

"Practically every metal . . . has been tested in actual service in oil wells. Of all metals and alloys. . . . commercially pure nickel has shown the greatest resistance to corrosion in oil well service.

"In a well at Spindletop, a sample of two inch nickel tubing suffered no measurable pitting penetration in three and one-half years. . . . . In this same well, plain steel or wrought iron tubing failed in less than 30 days."

Figures in the article show the savings in production effected through the use of a nickel strainer at Goose Creek, Tex. The Gulf Production Co. has standardized on all nickel strainers to replace those strainers which fail in service, the article points out.

Carbon Black Output, Sales Gain

WASHINGTON.—The production of carbon black in 1929 was 47 per cent above that of 1928, according to the U. S. Bureau of Mines. Output totaled 366,442,000 pounds in 1929.

Sales to domestic and foreign buyers in 1929 totaled 283,806,000 pounds, a gain of 3,400,000 pounds over 1928. Stocks greatly increased in 1929, being almost three times those at the end of 1928. They totaled 132,203,000 pounds on Dec. 31, 1929, compared with 50,240,000 pounds on hand Jan. 1, 1929.

A total of 264,107,000,000 cubic feet of natural gas was burned in the manufacture of carbon black in 1929, indicating an average recovery of 1.39 pounds per 1,000 cubic feet of gas, as compared with 1.42 pounds recovery in 1928, and 1.38 in 1927.

The center of carbon black production moved from Louisiana to the Texas Panhandle, indicating that the producers in the Monroe, La. field have begun to be affected by the competition of the large natural gas pipe lines that tap this field.

State Files Right-of-Way Suit on Ector Land

Staff Special
HOUSTON, May 15

SUIT to determine the respective rights of the state of Texas and the Texas & Pacific railroad to right-of-way lands in the oil development area of Ector county, West Texas, has been filed in Travis district court by Attorney General Robert L. Bobbitt.

A strip 200 feet wide and about five miles long, said to contain 156 acres, extending from the west line of survey six, block 44, is affected by the suit. Oil was discovered on adjacent land in the Judkins district and the railroad company is claiming fee title, making preparations to drill for oil on the right-of-way.

Except for the Hobbs area of Lea county, New Mexico, where production increases will follow the providing of pipeline facilities, the Judkins district is the currently most active spot in the Permian salt basin geological province. There, 26 producing wells were being exploited for 13,441 barrels, pinched production, May 9. More than 30 other tests are drilling.

The Judkins district is the only non-prorated flush area in the salt basin region. It has been mainly developed by the Cosden Oil Co., Inc., the Landreth Production Co., the Gulf Production Co., Simms Oil Co., Shell Petroleum Corp., Skelly & Amerada partnership and the Humble-Penn-Atlantic interests, who drilled the discovery well.

Other companies in the area are the Transcontinental Oil Co., The Texas Co., the Sunray and Llano partnership and the joint operations of the Tidal Oil Co. of Texas with the Independent Oil & Gas Co.

The Independent-Tidal test on the Scharbauer, in Sec. 6, Block 44, north of the Connell development, on the west side of the Judkins area, has shown disappointingly so far. It was last reported drilling below 3750 feet in soft brown lime. The test had a show of free oil at 3695-3700 feet, the quantity increasing slightly at 3707 feet. A show of "dead" oil was found at 3735 feet.

An important development in the southern part of the Judkins area was the topping of the salt marker formation high in the Transcontinental Oil Co.'s No. 1 University test, Sec. 3, block 35. With surface elevation of 2871 feet the salt top is 1731 feet above sea level, or 69 feet higher than the Landreth north offset, also 132 feet higher than the northeast offset of the Cosden Oil Co., Inc., on the Kloh.

Safety Suggestions for Plant and Lease

(Prepared by M. C. McDowell, division superintendent, Rio Bravo Oil Co., Houston)

DON'T monkey with poor monkey-wrenches. See that they are in repair and use the proper wrench on the job for which it is intended.

Finger rings cause accidents. The Rio Bravo recently had one reported. A worker's ring caught on a cotter key on the clutch of a gas engine. The worker was fortunate to escape with two cut and bruised fingers. Rings shou'd not be worn when working around moving machinery.

Ladders are like chains, only safe as their weakest rung. A ladder with weak legs or rungs is not a ladder. When using a portable ladder either nail the footing to a cleat or, if possible, have someone hold the ladder.

Every day should be nail extermination day. If one forms the habit of picking up nails or turning over planks with protruding nails it will be found surprising how many will appear in walks over various leases. Infection is the danger lurking with every nail exposed.

Piling material is a sign of good housekeeping and an aid to Safety practices. A safe pile is not too high or too near a passage-way, and has no ragged ends on its exposed sides. Well-piled material does not easily fall and is convenient to reach, as well as giving a neat appearance to the lease.

Good housekeeping applies to lease operation in numerous ways. All of us know from hearing and seeing our wives and mothers that a clean house is only accomplished by continual work or supervision. Rubbish and trash around buildings or wells make an eyesore of any lease.

Power installations and rig floors should be swept clean and the oil systems so cared for that oil is not permitted to run down the blocks or on the floors.

Waste containers made out of metal cans or barrels should be placed at all buildings to receive waste and rags used in cleaning and any such other trash as accumulates.

Ninety-nine per cent of all fires can be prevented with a little thought and work. Look out for the rubbish piles, as all old rags are seats of potential fires. Snuff out lighted matches and be sure they are out.

Stanley W. Duhig

Auditing Department Head Made Shell Secretary

SAN FRANCISCO, May 14.—Stanley W. Duhig, head of the auditing department of the San Francisco office of the Shell Oil Co. for over two years has been appointed acting secretary of the Shell Union Oil Corp., with offices at New York. He takes up his new duties at New York May 15.

Mr. Duhig has been with the Shell company since 1914. He spent 11 years in the Coalinga oil fields. He was office manager of the company at Long Beach and later auditor of production in the Los Angeles office.

He was head of sales department accounting for several years before he went to the San Francisco office, covering all of southern California and Arizona.

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Modern Refining—Science and Practice

By Colonel George A. Burrell*

Article 24

Acid Recovery Plants

Description of various processes for concentrating acid. The Pan and Bench System; Chemico Process; Simonson-Mantius Process; Geyser Action Process. Methods of Burning Sludge.

THE pan and bench system was the predominating system of concentrating acid in refineries in this country until about 1920. The first stage, or pan portion, of the system, has always been a series of shallow lead pans, but the second stage, or bench portion, originally consisted of glass retorts of "bottles" which were later supplanted by cast iron stills set in cascade formation.

Some refineries still employ this method but it has many outstanding disadvantages; fuel consumption is necessarily extremely high, losses in the pans or first stage concentration alone amount to 10 per cent, the fume nuisance is at its maximum, and maintenance costs renders this type of installation an uneconomic procedure. Cases are known where the lead repairs and replacements amounted to 5 pounds per ton of finished acid.

The pans are generally installed in a large building, either brick or corrugated asbestos walls and with roofing of the latter material. The life of this building is usually very short, seldom lasting more than a few years, due to the fumes attacking the building materials.

Usually the pans are constructed of 10 pound lead and are usually five feet wide, 15 feet long and ten inches deep. They are supported by asbestos covered cast iron plates laid over the top of the furnaces. Sixteen pans usually comprise an operating unit; they are intercommunicating in series.

Opinions differ as to the way in which the firing of the pans should be arranged. In the past this was not an important item because of the use of separated acid oil for this purpose and the unimportance of fuel values. However, the newer processes stress fuel economy insofar as the use of this separated acid oil renders a certain quantity of stock refinery fuel available for the market.

The weak acid is fed into No. 1 pan by gravity and flows from one pan to another. The vapors evolved carry large quantities of SO_3, which renders operating conditions extremely severe. Depending upon the percentage of ever present organic acids, a certain degree of foaming is always taking place. Pans frequently foam over. The decomposition deposits free carbon which must be removed by skimming before it adhers to the lead and causes the latter to burn out.

Passing from No. 16 pan as 60/62 degrees Be. acid, the final concentration to 66 degrees Be. was formerly effected by conducting the hot acid to glass retorts or bottles, each holding about half a ton of 60/62 degrees Be. acid. This was a dangerous operation due to bottle breakage, over which there was no control. The operation of the bottles, being intermittent or batch, rendered the fuel cost abnormally high and increased tendencies toward excessive breakage due to sudden expansion and contraction. This method of second stage concentration is now obsolete.

Refineries still using the "pan and bench" system of concentration employ a second stage combination of two or four cast iron pans or stills. These are generally about three to four feet wide, five to eight feet long and 10 inches deep. They are made of a close grained, grey cast iron, usually about two inches thick. A water-jacked or water-sprayed cover is provided for each still to serve as a reflux, and each still is connected to a condenser or scrubbing tower.

The vapors from the stills are scrubbed with water and any absorbed SO_3 is returned to the system in No. 1 pan as weak acid while the SO_2 vapors escape to the atmosphere. The life of these cast iron stills is very short, averaging less than two months of continuous service due to rapid corrosion and easy breakage. Operation of this second stage unit is also very costly and an additional 8 to 10 per cent operating loss is entailed. Most of the "pan and bench" systems are being rapidly supplanted by the more modern and efficient types of acid concentrators.

Chemico Process

This process is licensed by the Chemical Construction Co., of Charlotte, N. C. The first commercial plant was put into operation at Buffalo, N. Y., in 1920. Installations of this process have been made at refineries of the Standard Oil Co. of New Jersey, of New York and of Louisiana, at the Solar Refining Co., the Shell Co. of California, the Atlantic Refining Co., and at other refineries.

The process is two stage and is based on the principle of passing a mixture of hot air and flue gases through the liquid to be concentrated, which procedure gives more efficient results than pan concentration insofar as final temperature of concentration and fuel efficiency are concerned.

Both stages of the unit are similar in construction and operation. Each one consists of a distributing tank located on top of a preheating tower. Connected to this preheating tower is a flue constructed to accommodate a bath of acid. The hot air and flue gases are conveyed into this bath of acid by means of acid proof pipes which extend several inches below the surface of the acid. The temperature of the hot gases is from 1250 to 1300 F. and these bubble through the acid, driving off the water, and leaving

*Consulting Chemical Engineer, Pittsburgh, Pa.

ADVERTISING PAGES REMOVED

the stronger acid to be continuously drawn from the bath. The feed acid is trickled down through the checkered preheating tower and heat exchange is effected in this manner.

The acid in the bath of the first stage apparatus usually is 57/60 degrees Be. and is settled and skimmed of tarry and carbonaceous material before being charged to the second stage. The second stage apparatus is identical with the first and its operation is similar except that the semi-concentrated 57/60 acid is fed down the preheating tower from the distributing tank. The bath acid, through which the hot gases are bubbled, is the finished 66 degrees Be. acid.

In the earlier installations of this process, a packed scrubbing tower was provided for the purposes of reclaiming acid in the fumes, the gases from the top of the preheating tower entering the bottom of the scrubbing tower. The gases left the tower free from SO_3, but the SO_2 was not removed. The more recent installations use the Cottrell electrical precipitator. This type of scrubber has the advantage of higher exit temperatures for the gases, but it only removes the SO_3. SO_2 present will pass out into the atmosphere and still constitute a fume nuisance.

Chemico plants are so constructed to provide continuous operation. It is claimed that hot gases on entering the liquid below the liquid level, produce a sudden cooling, and in such a manner as to prevent dissociation taking place. The concentration takes place below the boiling point of the acid and the fuel consumption is economical as practically all of the heat is used in the evaporation of water.

Costs of operating the Chemico process per one ton of recovered 66 degree acid from 35 degrees sludge acid are given by Kaufman, follow:

Forty gallons of oil at 0.04 per gallon	$1.60
Labor	.20
General expense and repairs	1.10
Losses—6 per cent, based on $8.00 per ton of 60 degrees acid	.48
Process	1.00
Total	$4.38

Simon-Mantius Vacuum Process

This process is licensed by the United Lead Co. of New York. The first commercial plant was put in operation at the Vacuum Oil Co. refinery at Paulsboro, N. J., in 1921. This company now has a total of five units in operation and many refineries, Gulf, Continental, Standard Oil Co. of New Jersey, of Indiana, of Ohio, the Sinclair, Shell and other companies have this system in successful operation.

It is characteristic of this process that the concentration is carried on under high vacuum, this feature embodying the advantages of vacuum work, including the elimination of fumes and odors. The fuel consumption is materially decreased due to lowering the boiling point of the acid. Losses are reduced because of less decomposition. Radiation losses are small because of lower operating temperatures and acid losses due to leakage are eliminated.

This system is operated in both single and double stages, depending upon the quality of finished acid required, and the density of the weak acid to be concentrated. Where 61 degrees Be. acid is required, the concentration is carried on using 50 pounds pressure steam, and where 66 degrees Be. acid is required the concentration to 60 degrees Be. is carried on with steam brought to 66 degrees Be. by using hot, high flask cylinder oil circulated through closed end tubes made of acid resisting metal. Where the acid to be concentrated is 45 degrees Be. or stronger, the concentration to 66 degrees Be. acid is carried on in one stage using the hot oil circulating method of heating.

The vacuum is developed by the flow of water through a specially designed multi-jet, barometric condenser made of antimonial lead. The apparatus itself consists of a cast iron cylinder lined with chemical lead and this, in turn, is lined with acid proof brick set in acid proof cement. The brick lining is extended beyond the cylinder in the form of a cone and on top of this is an entrainment separator made of chemical stoneware. A copper or lead vapor line connects this point of the apparatus to the barometric condenser.

The system does not require any building and, because of the absence of fumes, can be located any place in the refinery. The ground area required for installation is small. The plant embodies standard acid proof equipment throughout, there are no moving parts in any portion of the apparatus, and the cost of installation is reasonable.

Operating costs depend upon the size of the plant, which have been built in units of 5 to 50 tons of finished acid per day. Under normal conditions, fuel requirements, when concentrating from 30 degrees Be. to 60/61 degrees Be. amounts to 3500 pounds of 80-pound pressure steam per ton of finished acid; maintenance averages 20 cents per ton, labor one man per shift, and operating losses less than 1.5 per cent, making the total operating cost between $1.50 and $3.50 per ton.

When concentrating this acid to 66 degrees Be. there is required an additional 13 gallons of fuel oil per ton, an additional 30 cents per ton maintenance, the operating losses increase to 8 per cent, bringing the total operating cost up to between $4.00 and $8.00 per ton.

Mantius[1] gives the cost of a separating and concentrating plant, using the vacuum process, to handle 200 barrels of sludge per day and recover 80 barrels of oil and 15 tons of 66 degree Be. acid as follows:

Separating		
Labor	$18.00	
Steam	20.00	
Chemicals	5.00	
Maintenance	10.00	
Miscellaneous	7.00	
Total	$60.00	$60.00
Concentrating		
Labor	$18.00	
Steam	22.00	
Oil	8.00	
Power	7.00	
Maintenance	15.00	
Total	$70.00	$70.00
Overhead		$70.00
Total per day		$200.00

The Simonson-Mantius plant at the Gulf Refining Co. at Port Arthur, Texas, consisting of four, 30-ton units concentrating to 61 degrees Be. acid shows a substantial profit.[2] This restored acid is then brought up to treating strength by putting it over the absorption towers of a contact acid plant.

At the Continental Oil Co., Ponca City, Okla., 30 to 35 tons of 66 degree Be. acid are recovered[3] per day from a mixture of 115 tons of heavy lubricating sludge and 15 tons of pressure distillate sludge. The sludge is separated as follows: 40 barrels of light oil sludge, 100 barrels of gas oil and 100 barrels of water are mixed in the separator and cooked with live steam for one hour. As soon as this cooking is finished, without cooling or settling, 230 barrels of cylinder stock sludge are drawn from the agitator directly to the separator and 175 barrels of gas oil and 140 barrels of water pumped simultaneously.

The entire mixture is cooked violently with live steam for three hours, settled six hours and the weak acid of 23/25 degrees Be. drawn off. This method of separation gives a yield of 70 to 80 per cent of the H_2SO_4 contained in the sludge. This weak acid is then delivered to the preliminary concentrator, where it is brought up to 54/58 degrees Be. settled and skimmed, then charged into the second stage concentrator and finished as 66 degree Be. acid having an acidity of 88/89 per cent H_2SO_4.

The upper layer in the above separating process is a liquid acid fuel, which is handled in the circulating fuel system for firing the distilling equipment. The middle layer consists of the so-called acid "coke" and presents the most difficult problem. While hot, it is soft enough to flow and can be drawn as a plastic mass from the separators, but when cool sets

[1]Oil & Gas Jour., March 10, 1927.

[2]Personal communication from Chas. Buerger, Chief Engineer.

[3]Observed by the author.

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to a brittle solid which will not soften on reheating.

This material is burned using a Duncan burner[4] installed under a 550 horsepower boiler and capable of handling 4000 pounds of acid coke per hour. The burner itself consists of a cylindrical shell 7 feet by 16 feet, fire brick lined, mounted in a substantially horizontal position on two annular runners resting on four trunnions. A driving mechanism revolves the entire retort on the trunnions and the burner resembles a small rotary kiln.

The fuel is fed into one end of the burner by means of a variable speed screw conveyor. Continual agitation is given the fuel mass by the rotation of the cylinder. In this way the fuel is brought in contact with the hot lining and gas is evolved which readily ignites, insuring continuous combustion.

Air, under forced draft, is admitted around the feed screw in a radial direction so that the fuel mass is completely consumed. Sufficient air may be used in the burner proper to give complete combustion, or if preferred, the burner can be operated as a gas producer and the combustion completed under the boiler or still with secondary air. The complete installation consists of the burner described, a chain drag conveyor to transfer the sludge from storage hopper to the burner feed hopper and an overhead crane and clam shell bucket for handling the sludge from the drain pits to the storage hopper.

Many Simonson-Mantius vacuum plants are in operation where the concentration proceeds only to 60/61 degrees Be., this acid being used for treating pressure distillate. Any remaining unused acid is blended with 20 per cent fuming and the resultant 66 degree Be. (93 per cent H_2SO_4) acid used for lubricating oil treating.

Geyser-Action Process

This is the name given to the process licensed by the Geo. F. Hurt Engineering Corp. of New York City, and is the application of the Skoglund[5] principle of concentrating chamber acid to the concentration of refinery sludge acids. The concentration is carried on by passing hot gases through a spray of the acid.

A current of compressed air is injected beneath the surface of a shallow body of acid creating the geyser action and blowing a portion of it into a vertically directed spray, so that the spray, after coming into contact with the hot flue gases, falls back again into the body of acid under treatment.

The flow of acid is countercurrent to that of the gases so that the hottest gases meet the strongest acid and the cold acid entering the other end of the flue meets the coolest gases. Evaporation of water and a small amount of sulfuric acid takes place, the liquid body being thus reduced and concentrated.

As the gases, which are growing cooler, approach the cold end of the geyser flue they reach a point where the acid is no stronger than when it entered but is at its boiling point, having been preheated by the gases. The gases, then consisting of the furnace gases, together with water vapors and acid mist, are passed through a filter containing obstructions which so subdivide the gases that they flow in minute streams which impinge against the obstructions, knocking out condensed acid which is returned to the geyser flue.

Most of the acid vapors are thus removed but to prevent any undue quantity being discharged to the atmosphere the gases are finally passed through a condenser where water is sprayed against them. All of the SO_3 is removed but the SO_2 nuisance remains.

Most of the carbon is finely enough divided to remain in suspension in the acid. Also most of the compounds formed by reaction between the acid and oil remain in suspension in the acid. In time solids clog up the apparatus, hence it has to be frequently cleaned. The essential elements are the Geyser flue, the filter and the condenser.

Auxiliary apparatus includes an oil furnace to furnish the hot gases (located immediately ahead of the Geyser flue); an exhauster to furnish draft (located between the Geyser flue and filter); a cooler, to lower the temperature of the product acid (located between the hot end of the Geyser flue and the product tanks); a product pump, to receive the product acid from the product tanks and to deliver it to storage for reuse; an air compressor, receiver, pressure regulating valve and distributing lines to the nozzle pipes, which extend from above the ceiling of the Geyser flue, through it and down into the pool of acid. A suitable supply of water (for cooling and for condensing) and of electric current, are required.

This process has been successfully used in the handling of chamber acids but is still in the experimental and development stage as far as separate weak acids from petroleum sludges are concerned.

Disposal of Sludges by Burning

Some refineries burn the sludge as it is received from the agitators. The fuel system must be made of acid-resisting equipment. No detrimental effects take place on the vessel to which the heat of combustion of this material is applied unless the burners are shut down. If this happens alkali must be sprayed into the fire box to prevent corrosion.

Acid sludge from the treatment of long residuum with sulfuric acid, at the Fort Worth plant of the Texas & Pacific Oil Co., is burned in the furnaces by means of a special valve and burner developed by J. S. Booth of the Barnsdall Refining Co. The Barnsdall Co. has done considerable development work on this particular problem and is also obtaining favorable results.

The sludge is drawn from the agitators to a mixing tank where it is blended with fuel oil in the proportion of 70 parts sludge to 30 parts oil, with a small percentage of lime. The lime tends to keep the sludge in suspension and prevents the formation of big hard lumps. In the mixing tank, the oil, sludge and lime are violently agitated by a high speed, motor-driven propeller and kept heated by steam coils to about 100 F. The fuel line conveying the sludge and oil to the furnaces is in the form of a loop. Through it the sludge mixture is constantly circulated by a piston pump taking suction from the bottom of the mixing tank and returning the unused oil continuously into the top of the tank.

The special sludge burning valve is built in the shape of a U with a stem in the middle, which is the feed nozzle leading into the furnace. Each end of the U is connected into the circulating fuel line. In the base of the U there is a housing in which a brass propeller wheel, eight inches in diameter, is rotated like a water wheel.

The oil sludge mixture going through the line furnishes the power for this wheel. There is a plunger on the propeller shaft and this is worked back and forth like a plunger pump by the oscillating motion of the propeller which is imparted to it by a cam. This pump arrangement breaks up, and forces through the line to the burner, any of the sludge that may lodge in the propeller housing. The valving arrangement of the burners is such that by closing a valve, any burner can be by-passed when necessary.

Barbour[6] burns cylinder stock sludge by dumping it through a strainer into a kettle containing fuel oil heated to 120 F. and agitating it by blowing air through it at a temperature of 180-200 F. The mixture is kept agitated with live steam until used as fuel under the stills.

Osborne and Davis[7] mix cylinder stock sludge, pressure distillate sludge, acid oil, hot water and solvent oil, and cook the mass with steam. Next it is settled, whereupon three layers form; a bottom layer of 24 degrees acid, a middle layer of so-called wet sludge and top layer of oil. The acid layer is drawn off, the kettle again cooked, settled and acid again drawn off. The middle wet sludge layer is then drawn off and weak acid drained from it. Next most of the top oil layer is drawn off.

The weak acid is concentrated in the acid recovery system, the top fuel oil burned in the regular circulating fuel oil system and the wet sludge kept

[4]W. M. Duncan, Illinois Stoker Co., Alton, Ill.
[5]J. Soc. Chem. Ind., 1917, p.925.
[6]Before Am. Pet. Inst., Chicago, Ill., Dec. 7, 1928.
[7]Marland Oil Co.

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hot and burned in a Duncan rotary burner.

The Atlantic Refining Co.,[8] Philadelphia, Pa., disposes of its sludge from acid treatment, residue from treating tanks and bottom settlings by coking the mass as it is pushed down a heated inclined plane into the combustion chamber of a boiler or still furnace.

The Transcontinental Oil Co.,[9] has developed various methods of burning lubricating acid sludge from the treating of heavy oils. In one method heavy sludge is burned just as it is, on grate bars, stocking it by hand.

Another method for utilizing sludge is to mix it with fuel oil, using steam for agitation. The resulting mixture can be circulated and burned directly through ordinary burners. This method is open to the objection that some corrosion develops. The average acid sludge obtained from lubricating oil has a B.t.u. value of 14,450 per pound, a sulfur content of 6.9 per cent and an ash content of 1.4 per cent.

Transcontinental's most recent method of burning acid sludge consists essentially in drawing the acid solution from the agitators into a small storage bin, from which it gravitates into a series of screw conveyors. While the sludge is passing through these screw conveyors, it is intimately mixed with a small amount of fuel oil. It is then pumped into a suitable storage tank, from which it is continuously circulated through a burner line and is burned through ordinary oil burners under our stills and boilers.

The question of whether it is more advisable to recover the acid from sludge or burn it directly is a problem, depending upon factors existing at a particular plant. As a general rule it is not profitable to attempt to recover the acid content of very heavy lubricating oil sludges, on account of the small percentage of acid recoverable from such sludges and the plant investment necessary for this purpose. One factor is the matter of use of the recovered acid in dilute or concentrated form. If the dilute acid is used, for pressure distillate treating, or clay treatment, the plant investment and operating costs of a recovery plant is materially reduced in that it is not then necessary to concentrate the acid to the usual concentration.

Lang and Love[10] found that the burning of acid sludges blended with fuel oil under boiler or preheater tubes does not result in serious corrosion unless the temperature of the tubes is low enough to allow moisture to condense on them, in which case sulfuric and sulfurous acids are formed, resulting in severe corrosion, but since tube temperatures are low enough to condense moisture only during the "firing-in" period, if a low sulfur fuel oil is used during this period corrosion from the acids will be negligible.

[8]Oil & Gas Jour., Dec. 1928, p.139.
[9]Personal communication from Sidney Born, Asst. Gen. Supt.
[10]Before Am. Chem. Soc., Minneapolis, Minn., Sept. 1929.

New Patents

Prepared by R. E. Burnham, patent and trademark attorney, 1343 H Street, N. W., Washington, D. C., from whom copies may be obtained at the rate of 20c each. State number of patent and name of inventor when ordering.

April 29, 1930

REFINING

Process of treating oils—Carbon P. Dubbs, Wilmette, Ill., assignor to Universal Oil Products Co., Chicago, Ill. Filed Feb. 10, 1922. No. 1,756,018.

Process for producing lower-boiling-point hydrocarbons—Carbon P. Dubbs, Wilmette, Ill., assignor to Universal Oil Products Co., Chicago, Ill. Filed Jan. 14, 1925. No. 1,756,019.

Process of refining oils—Lyman C. Huff, Chicago, Ill., assignor to Universal Oil Products Co., same place. Filed Feb. 20, 1928. No. 1,756,026.

Apparatus for removing carbonaceous deposits from oil apparatus—Lyman C. Huff, Chicago, Ill., assignor to Universal Oil Products Co., same place. Filed July 22, 1925. No. 1,756,027.

Apparatus for removing carbon deposits from oil apparatus—Lyman C. Huff, Chicago, Ill., assignor to Universal Oil Products Co., same place. Filed July 22, 1925. No. 1,756,028.

Art of continuous distillation—Nathaniel E. Loomis, Westfield, N. J., assignor to Standard Oil Development Co. Filed June 8, 1922. No. 1,756,032.

Manufacture of lubricating oils—Eugene C. Herthel, Chicago, Ill., and Harry L. Pelzer, Highland, Ind., assignors to Sinclair Refining Co., New York, N. Y. Filed June 16, 1928. No. 1,756,153.

Refining hydrocarbon oils—Eugene C. Herthel, Chicago, Ill., and Harry L. Pelzer, Highland, Ind., assignors to Sinclair Refining Co., New York, N. Y. Filed June 16, 1928. No. 1,756,154.

Refining hydrocarbon oils—Eugene C. Herthel, Chicago, Ill., and Harry L. Pelzer, Highland, and James G. Stafford, Whiting, Ind., assignors to Sinclair Refining Co., New York, N. Y. Filed June 16, 1928. No. 1,756,155.

Refining hydrocarbon oils—Eugene C. Herthel, Chicago, Ill., and Harry L. Pelzer, Highland, Ind., assignors to Sinclair Refining Co., New York, N. Y. Filed June 16, 1928. No. 1,756,156.

Oil-still—Arnold C. Vobach, Whiting, Ind., and Eugene C. Herthel, Chicago, Ill., assignors to Sinclair Refining Co., New York, N. Y. Filed Feb. 12, 1927. No. 1,756,407.

Art of cracking hydrocarbons—Louis Link, Baton Rouge, La., assignor to Standard Oil Development Co. Filed May 28, 1923. No. 1,756,563.

Oil-cracking process—Alfred Schwarz, Montclair, N. J., assignor to Petroleum Sand Products Corporation. Filed Feb. 25, 1924. No. 1,756,887.

PRODUCTION

Sliding bearing bushing for pump construction—Alfred H. Bowlzer, jr., Los Angeles, Cal., assignor to Kimball-Krough Pump Co. Filed April 26, 1927. No. 1,756,276.

Long-stroke pumping-jack—John S. Hunter, Coalinga, Cal. Filed Oct. 26, 1929. No. 1,756,089.

Pump-jack—Linnie G. Nordstrom, Galva, Ill. Filed Aug. 8, 1929. No. 1,756,098.

Casing-cutter—Albert M. Monroe, Taft, Cal. Filed June 25, 1927. No. 1,756,128.

Polished rod for oil-well pumping—Sumner B. Merrick, Hanover, Mass., assignor to Merrick & Longbottom, Inc. Filed Sept. 1, 1928. No. 1,756,205.

Drill—Harry R. Decker, Houston, Tex., assignor to Decker Oil Tool Co., same place. No. 1,756,285.

Attachment for well-drilling rigs—Ira A. Karns, Wichita Falls, Tex. Filed May 14, 1927. No. 1,756,364.

Drill—William W. Landrum, League City, Tex. Filed July 27, 1929. No. 1,756,489.

Tubing-drain—William H. Allen and Morris E. Standifer, Goose Creek, Tex. Filed Dec. 27, 1927. No. 1,756,499.

Apparatus for exhausting wells—Charles A. Anderson, Los Angeles, Cal. Filed May 22, 1928. No. 1,756,500.

Core-drill—Reuben C. Baker, Coalinga, Cal., assignor to Baker Oil Tools, Inc. Filed Jan. 31, 1928. No. 1,756,503.

Expanding drill or reamer—Stewart L. Campbell, Berkeley, Cal. Filed Feb. 14, 1928. No. 1,756,509.

Expansive reamer and drill—James J. Santiago, Los Angeles, Cal. Filed Dec. 27, 1927. No. 1,756,524.

Oil-well casing head—William E. Keenan, Lefors, Tex. Filed Aug. 30, 1928. No. 1,756,597.

Casing-cover and tool-holder for wells—Frederick W. Sadler, Oklahoma City, Okla. No. 1,756,799.

Drilling-rig—Merton T. Archer, Pittsburgh, Pa., assignor to National Supply Co., Toledo, Ohio. Filed Mar. 31, 1928. No. 1,756,804.

MISCELLANEOUS

Liquid measuring and dispensing apparatus—Malcolm J. Crawford, London, England, assignor to Wayne Co. of Indiana. Filed June 17, 1927. No. 1,756,085.

Safety gasoline-hose—John M. Oden, Brooklyn, N. Y. Filed Jan. 11, 1927. No. 1,756,698.

May 6, 1930

REFINING

Method of eliminating colloidal asphaltenes and carbenes from fuel oil—Alphonsus Jurrissen Martinez, Cal., assignor to Simplex Refining Co. Filed Jan. 24, 1925. No. 1,756,981.

Apparatus for condensing hydrocarbon vapors—John E. Bell, Brooklyn, N. Y., assignor to Sinclair Refining Co., New York, N. Y. Filed Jan. 22, 1925. No. 1,757,108.

Device for separating gasoline from lubricating oils—William Schwalge, Elmburst, Ill. Filed May 11, 1926. No. 1,757,223.

Art of pressure distillation—Nathaniel E. Loomis, Elizabeth, N. J., assignor to Standard Oil Development Co. Filed May 16, 1922. No. 1,757,579.

Method and apparatus for processing heavy oils—Arthur J. Slagter, Muskogee, Okla., assignor to Transcontinental Oil Co., Pittsburgh, Pa. Filed March 28, 1924. No. 1,757,596.

Process for cracking heavy hydrocarbons to produce lighter hydrocarbons—Harry L. Pelzer and Eugene C. Herthel, Chicago, Ill., assignors to Sinclair Refining Co., New York, N. Y. Filed Sept. 16, 1922. No. 1,757,843.

PRODUCTION

Well-tool—William A. Vock, Long Beach, and Amos C. Towne, Lomita, Cal. Filed June 25, 1928. No. 1,757,064.

Valve for oil-pumps—Herman W. Platenberg, Los Angeles, Cal., assignor to Axelson Machine Co., same place. Filed Oct. 14, 1926. No. 1,757,139.

Gas-oil separator—George C. Stanley, New York, N. Y., assignor to M. W. Kellogg Co. Filed Dec. 23, 1926. No. 1,757,267.

System for shooting wells by radio—Warren F. Bleecker, Boulder, Colo. Filed Sept. 7, 1926. No. 1,757,288.

Oil-well flow device—Carl P. Nielson, Long Beach, Cal. Filed Feb. 9, 1927. No. 1,757,329.

Fluid elevator—Oliver Morgan and Howard W. Strait, Wewoka, Okla. Filed Jan. 14, 1928. No. 1,757,381.

Fluid elevator—William H. Hughes, Pampa, Tex. Filed Feb. 28, 1928. No. 1,757,460.

Deep-well pump—Donald D. Burch, Earlsboro, Okla. Filed Feb. 26, 1929. No. 1,757,791.

MISCELLANEOUS

Siphon outlet for truck-tanks—Andrew A. Kramer, Kansas City, Mo. Filed June 21, 1926. No. 1,757,317.

Liquid-dispensing apparatus—Arnold P. Hitzman, Fort Wayne, Ind., assignor to Wayne Co., same place. Filed April 2, 1929. No. 1,757,836.

Motor fuel—Carl O. Johns, Elizabeth, N. J., assignor to Standard Oil Development Co. Filed May 21, 1924. No. 1,757,837.

Liquid fuel—Carl O. Johns, Elizabeth, N. J., assignor to Standard Oil Development Co. Filed May 21, 1924. No. 1,757,838.

Circular Lists All Chemical Elements

NEW YORK, May 12.—The 92 known chemical elements of which all things in this world are composed, are listed in a circular published by the P. C. Kullman & Co., 110 Nassau St., here.

This circular gives the names of these elements their atomic numbers, symbols, atomic weights, melting points and the years of discovery. These elements include gaseous, liquid, metallic crystalline and amorphous.

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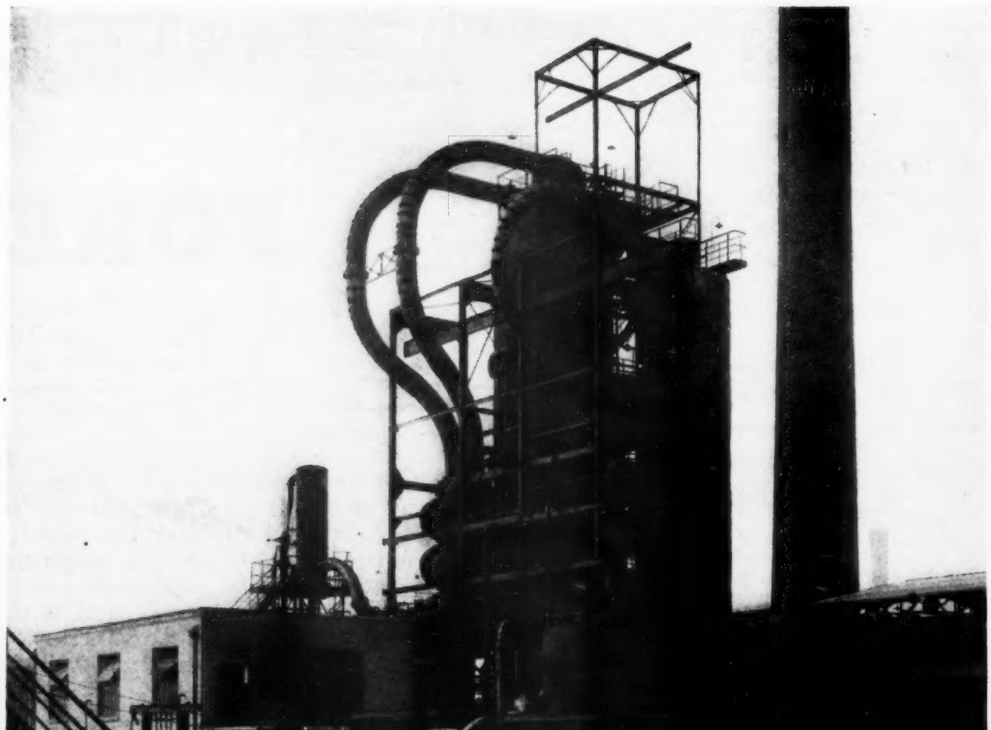

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Apparatus for Vacuum Distillation Of Lubes and Heavy Oils

By Martin J. Gavin[2] and Arch L. Foster[3]

DURING the recent study of lubricating oils carried on in the San Francisco laboratory of the U. S. Bureau of Mines, it became desirable to distill the oils used in the experimental work at pressures as low as 10 millimeters (mercury column) absolute. In the effort to overcome difficulties and eliminate sources of error, certain changes were made in the apparatus for vacuum distillation used by the Bureau of Mines for crude petroleum[4]. These changes were described in Report of Investigations 2819, issued in July, 1927.

Subsequent to the publication of Report of Investigations 2819 several other changes have been made, and the present form of the apparatus for vacuum distillation of lubricating oils is described in this revision of Report of Investigations 2819. These changes were found to give more accurate checks on duplicate distillations. The major part of the credit for the laboratory work which developed the changes in the apparatus and method revised herein is due to Boyd Guthrie, assistant petroleum chemist, and R. V. Higgins, junior chemist, of the San Francisco laboratory, U. S. Bureau of Mines.

THE proper handling of vacuum distillations in the laboratory is a matter requiring a very careful technique to obtain the proper degree of accuracy, and to develop a system which gives both accurate and reproducible results.

This is especially true in distilling heavier oils, where surface tension and viscosity complicate the problem. Under such conditions it is necessary to study the characteristics of the material to be distilled, to design the apparatus, and to adjust the method of operation to fit those conditions.

The apparatus described here has been developed especially to prevent incidental contamination of the overhead vapors by spray from the column, and the results appear to be quite satisfactory. Drawings included with the article show the simplicity of this apparatus, which can be made up in any refinery laboratory.

Description of Apparatus

The distilling flask employed is essentially the Hempel flask as used by the U. S. Bureau of Mines for the analytical distillation of petroleum[5]. The complete apparatus is shown in Fig. 1. The fractionating column and exposed portion of the flask is wrapped with ¼-inch asbestos rope and then surrounded by a cylindrical hood of ⅛-inch pliable asbestos sheet with a narrow air space between the wrapping and the cylindrical hood. This was found necessary to prevent any radiation or convection heat losses from the column, and resulted in obtaining a more even and constant fractionation by eliminating any dephlegmating action caused by temperature changes around the column.

[1]Reprinted from U. S. Bureau of Mines Report of Investigations 2996.

[2]Refinery engineer, U. S. Bureau of Mines.

[3]Former associate petroleum chemist, U. S. Bureau of Mines, now Staff Writer, National Petroleum News.

[4]Dean, E. W. and others; Analytical Distillation of Petroleum, and its Products. Bull. 207, Bureau of Mines, 1922, pp. 10-23.

[5]See footnote 4.

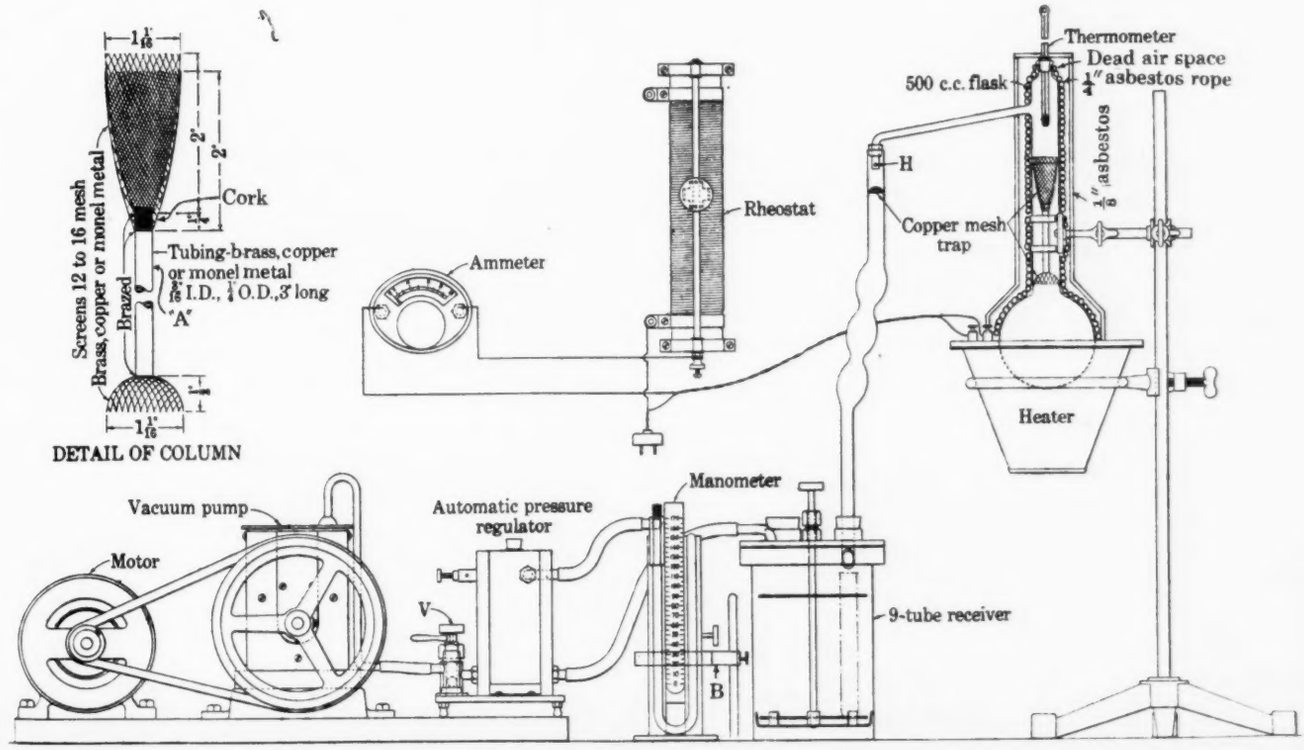

Fig. 1—Vacuum-distillation apparatus

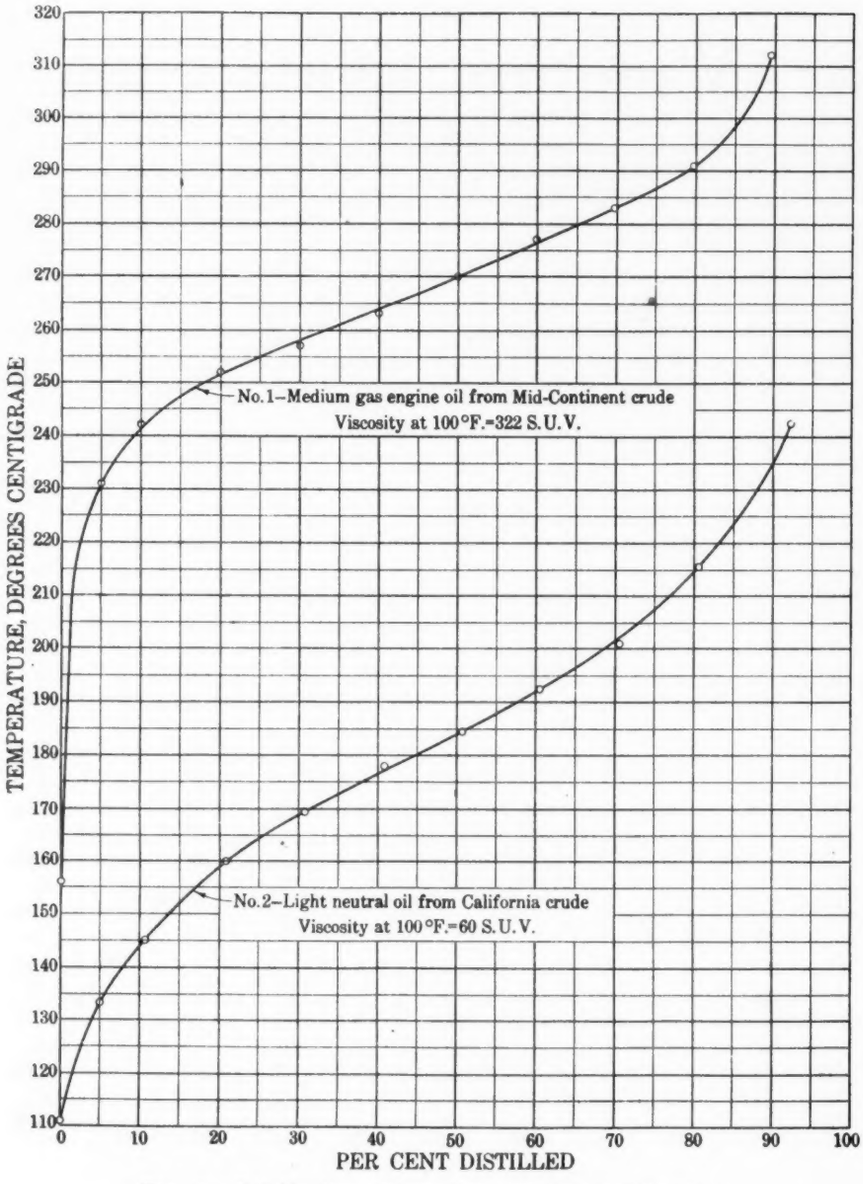

Fig. 2—Distillation curves for two lubricating oils

As air leakage at connections is an ever-present or potential source of difficulty and error in vacuum apparatus, the mouth of the flask is drawn down to 1 centimeter internal diameter which materially simplifies obtaining an air-tight seal at this point. Before reducing the mouth, the spray screen is inserted and adjusted in position.

This screen is made of copper or brass gauze of 10 to 14 mesh, brazed or silver-soldered to a copper or brass tube of 4 or 5 millimeters internal diameter. It is essential that the mesh of this screen be not too close or a column of oil will build up above it and eventually spatter over into the delivery tube. It is also important that the gauze have sufficient strength and rigidity to support the screen against the strains put upon it in charging, cleaning, etc.

After the screen is inserted into the neck of the flask it is conveniently held in place by heating small points on the neck wall with a blast flame and forcing the glass inward with a sharp point. Three or four points so placed at intervals just above and below the upper and lower screens will suffice to retain the screen in position.

It was found that a cork inserted in the hollow tube, A, would prevent any hot oil which might gather there from rising in the tube and striking the thermometer and at the same time would not hinder the distillation.

Much trouble from bumping was experienced when heavy oils were distilled at 10 millimeters. Observation showed that the explosive vaporization in the overheated bottom layer of oil was coincident with the fall of the condensed droplet which collected at the discharge end of the side neck and plugged the vapor line until the drop fell of its own weight. This permits a slight building up of pressure in the flask, and when the drop falls and opens the line, the sudden release of this increment of pressure permits the vaporization to occur at such a rate as to approach the proportions of an explosion, throwing liquid oil up through the screen and over into the delivery tube, vitiating the results of the determination.

To eliminate this trouble two 1/16-inch holes were blown in the end of the delivery tube ¼-inch above the lowest extremity, as shown in Fig. 1, H; this permits drops to form and fall into the condenser and at the same time prevents the slight fluctuation in pressure within the flask, which causes the bumping. Under this arrangement, the distillation proceeds as smoothly as at atmospheric pressure.

The condenser and receiver used are those described in U. S. Bureau of Mines Bulletin 207[6]. The receiver holds nine graduated test tubes for collecting the various fractions.

To increase condenser efficiency a small gauze screen is inserted, convex side up, in the condenser just below the delivery tube; this distributes the hot condensate evenly over the condenser wall, allows it to cool to a lower temperature before it reaches the receiver, and decreases or eliminates the volume correction to be applied to the distillate fractions for contraction on cooling in the receiver tube.

The pump used by the writers is a regular Cenco Hy-Vac. Pumps of this general type have ample capacity and if the system is carefully sealed, distillations may be carried out with ease at 2 millimeters or lower.

The level B, Fig. 1, was installed so that more accurate manometer readings could be made in order to prevent error arising from drawing a line of sight from the top of the meniscus to the gauze.

The distillation procedure is as follows: The desired quantity of oil is poured into the flask through a long funnel. A distillation thermometer with a tight-fitting cork is adjusted in the mouth of the flask, and the delivery tube is connected to the condenser by a snug cork. The joints are luted with litharge-glycerin paste, and the pump is started. When the pressure has been reduced to the desired degree, as indicated by the closed manometer, the valve, v, is partly closed and by trial is adjusted so that the pressure is constant. The heating is started, the oil brought to distilling temperature very gradually with steadily increasing heat, and the slide wire rheostat so regulated that the oil distills at a rate of 3 to 5 cubic centimeters per minute. Some manipulation of the control value, v, is necessary to adjust the pressure after the system is in full operation, but once adjusted remarkably little attention is required to keep it regulated within very narrow limits. Ordinarily the automatic pressure regu-

[6]Ref. cited.

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lator is not used, as manual control of pressure is quite satisfactory. If the regulator is not used it is advisable to have a reservoir of at least 1 liter capacity in the suction line between the valve, v, and the receiver to smooth out minor pressure fluctuations.

The distillation is run at a pressure of 10 millimeters of mercury and for a charge of 250 cubic centimeters of lubricating oil the rate of distillation is 3 to 5 cubic centimeters per minute. The vapor temperature is recorded for each 25 cubic centimeter fraction. The distillation is not conducted above 325 C. (617 F.), as above this temperature cracking may occur.

The rate of distillation is important for obtaining concordant results. The best indication of the true distillation rate seems to be the rate of dripping from the end of the delivery tube rather than the rate of filling of the receiver. Because of the continual increase of viscosity of the distillate, the length of time required for a given increment to pass through the condenser is continually increasing as the distillation progresses, and a continually larger quantity of distillate is held in the condenser because of the viscosity of the oil. Also, the temperatures vary with the distillation rate, and the degree of fractionation is also affected. For these reasons it is essential to maintain the rate of distillation between 3 and 5 cubic centimeters per minute.

By this apparatus and method it is a comparatively simple matter to obtain clean-cut distillations, on which the data are accurate, comparable, and reproducible. Vapor temperatures, especially, are more reliable and reproducible than with any other method so far attempted.

Distillation results on two oils varying widely in volatility and viscosity are shown in Fig. 2.

New Equipment

Pyrene Manufacturing Co., Newark, N. J., is offering for the benefit of the petroleum industry a report recently issued entitled "Foam Distribution Through Fixed Piping Systems."

This report discusses in detail the principles governing the installation and use of fire fighting systems, construction details of installations to adequately protect different types of hazards, including capacity of accumulators, sizes of lines, ratio of sizes, lengths, etc., in header systems, and general rules for the construction and handling of such apparatus.

* * *

Union Carbide Co., 205 E. 42nd St., New York, has completed an 11-story building at 910 Baltimore Ave., Kansas City. This building brings to-

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gether the various units of the company, including the Linde Air Products Co., Prest-O-Lite Co., Inc., Oxweld Acetylene Co. and the Union Carbide Sales Co. These companies make everything for oxy-acetylene welding and cutting.

* * *

The Vapor Recovery Systems Co., Compton, Calif., has published bulletins No. 1, 2 and 3 on Varec safety vent valves for tanks on gauge and thief hole covers and super tank gauges.

The bulletin on safety vent valves includes a table on computing working gauge pressures and tells how to find the hourly breathing volumes of a tank. It also gives a conversion table for inches of water to ounces of pressure.

The Varec gauge and thief hole cover has been constructed in accordance with the Standardization Committee of the American Petroleum Institute recommendations that all cone roof tanks be made with a roof pitch of ½ inch in 12 inches and to withstand two ounces of internal gauge pressure the shell construction to withstand one ounce internal gauge vacuum.

The Varec super tank does away with the human element, it is automatic, it has no gears and you read the figures direct from the tape. Friction has been lessened with specially designed stainless steel ball bearings and races. A float made of pure sheet aluminum is standard equipment. It has tough malleable iron fittings, has non-sparking moving parts, spark eliminator and gravity compensator. The bulletin includes installation instructions.

* * *

The Turbo-Mixer Corp., New York, manufacturer of agitating and allied equipment, has appointed J. E. Moul general manager. Mr. Moul was formerly president and general manager of Gifford-Wood Construction Co., New York.

* * *

Federal Phosphorus Co., division of The Swann Corp. Graybar Bldg., New York, manufacturer of diphenyl a new basic chemical adapted for use in the process industries including oil refining has transferred G. B. Cunningham, assistant sales manager, to the New York offices of the Swann company. Mr. Cunningham was formerly at the Birmingham, Ala., office of the Federal company.

* * *

Baash Ross Tool Co., Los Angeles, announces that L. F. Baash, president, left on a trip the first week of May for the major oil fields of Texas, Oklahoma, Kansas, lower Michigan, Canada, Montana and Wyoming. Mr. Baash expects to be gone until July. He will be accompanied by H. H. Clark, vice president and sales manager, beginning June 1.

Gasoline Plant Uses Old Reabsorber And Salvaged Equipment

By Arch L. Foster
N. P. N. STAFF WRITER

MONROE, La.

PROFITABLE extraction of natural gasoline from gas containing only 0.30-gallon per 1000 cubic feet of gas, in a specially designed plant at 400 pounds working pressure, and the conversion of surplus dry gas into carbon black at the rate of one to one and one-fourth pounds of black per 1000 cubic feet of gas, are the results achieved by the United Carbon Co. of Monroe, La., operating in the Monroe and Richland gas fields.

The large quantity of gas available from these fields supplies 22 absorption plants five of which have been built in or near the town of Alto within the last six months. In addition to the gasoline plants, a considerable number of carbon black plants are in operation, either on the extracted gas from the gasoline plants or on "dry" gas from areas producing gas so lean as to make it unprofitable for gasoline extraction.

This great gas area supplies gas to several cities within a radius of several hundred miles, mains having been laid to St. Louis, Memphis, New Orleans, Birmingham and Atlanta, and to connect with other lines to the west. As yet, however, the demand from these cities is insufficient to utilize the enormous quantity of gas produced, so the surplus is converted into carbon and lamp blacks, supplying a large portion of the demand from the rubber industry, ink manufacture, and other purposes. At least one ink factory is in regular operation in this immediate territory, with the probability that others may be erected in the near future.

The newest plant of the United Carbon Co. was designed by the company's engineers collaborating with the Southwestern Engineering Corp. of Los Angeles. It has a daily capacity of thirty million cubic feet of gas, and was so designed and arranged with oil and gas headers that the capacity may be increased to fifty million feet per day by the addition of two more absorbers. The present installation includes three Southwestern absorbers 48 inches in diameter by 38 feet high, constructed in four courses of one-inch steel plates with double riveted butt-strap seams.

A centrifugal scrubber receives the gas and gives it an initial scrubbing before it enters the absorbers; a final scrubbing is given the outlet gas in another scrubber equipped with an automatic oil trap. The three absorbers each weigh 38,000 pounds, and are equipped with steel bubble plates and cast iron bubble caps. A Chaplin Fulton Liquid Level controls the discharge of the oil into a weathering tank.

The bubble type still is 60 inches diameter by 36 feet high, equipped with conventional cast iron caps; a reboiler or stripper is installed in the oil-discharge side of the still and serves to strip the last traces of gasoline from the oil returning to the absorbers, using live steam in a closed coil.

A Southwestern Type P fractionating column 24 inches by 42 feet and equipped with 24 cast iron bubble capped plates, fractionates the raw gasoline to the grade desired, using steam. The 24 inch by 42 feet reabsorber column is of an older type and was a part of an older plant recently dismantled by the company,

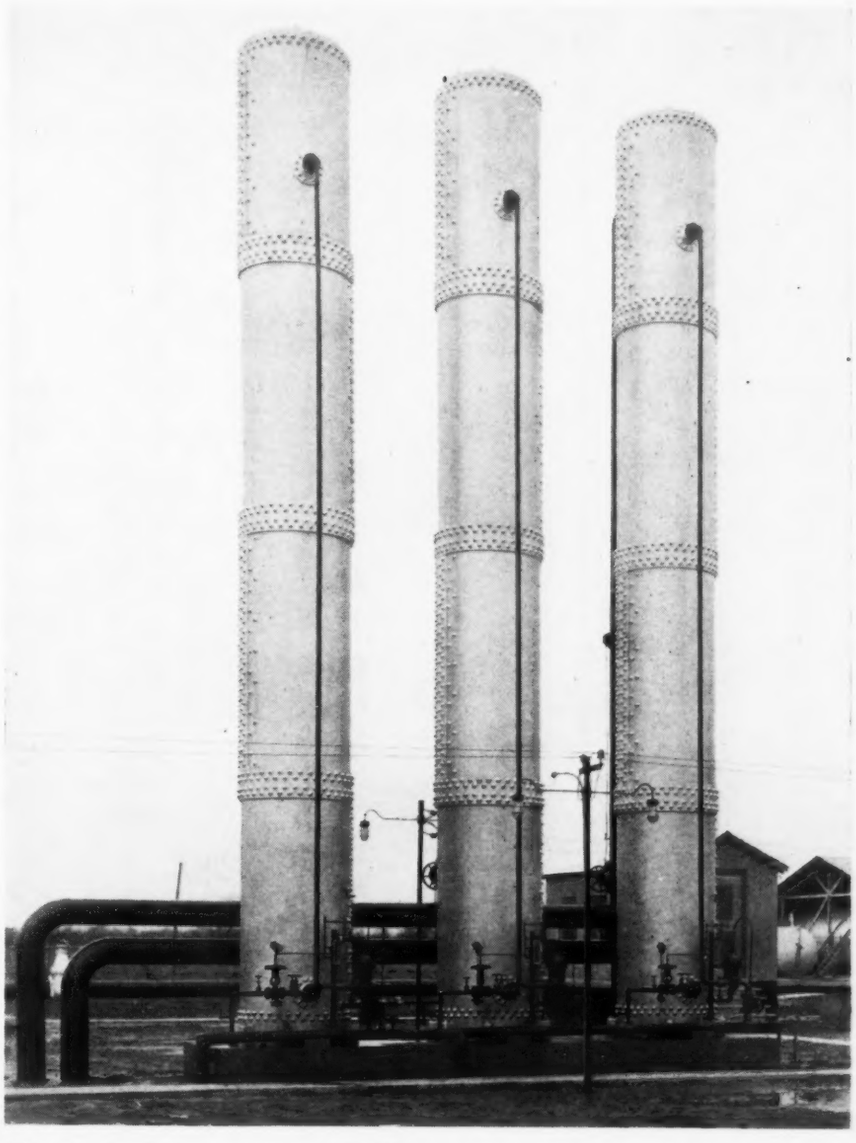


Fig. 1—Specially constructed 38,000-lb. Southwestern absorbers, installed in the United Carbon Co.'s plant at Alto, La.

but is so efficient that it was included in this plant.

Tanks, boilers, the smaller pumps and most of the fittings used in the plant were salvaged from older dismantled plants; the larger pumps were purchased for this unit, and designed to serve under the higher pressures here used. A Fluor redwood cooling tower cools the water used in the plant, and permits recirculation with the resultant saving.

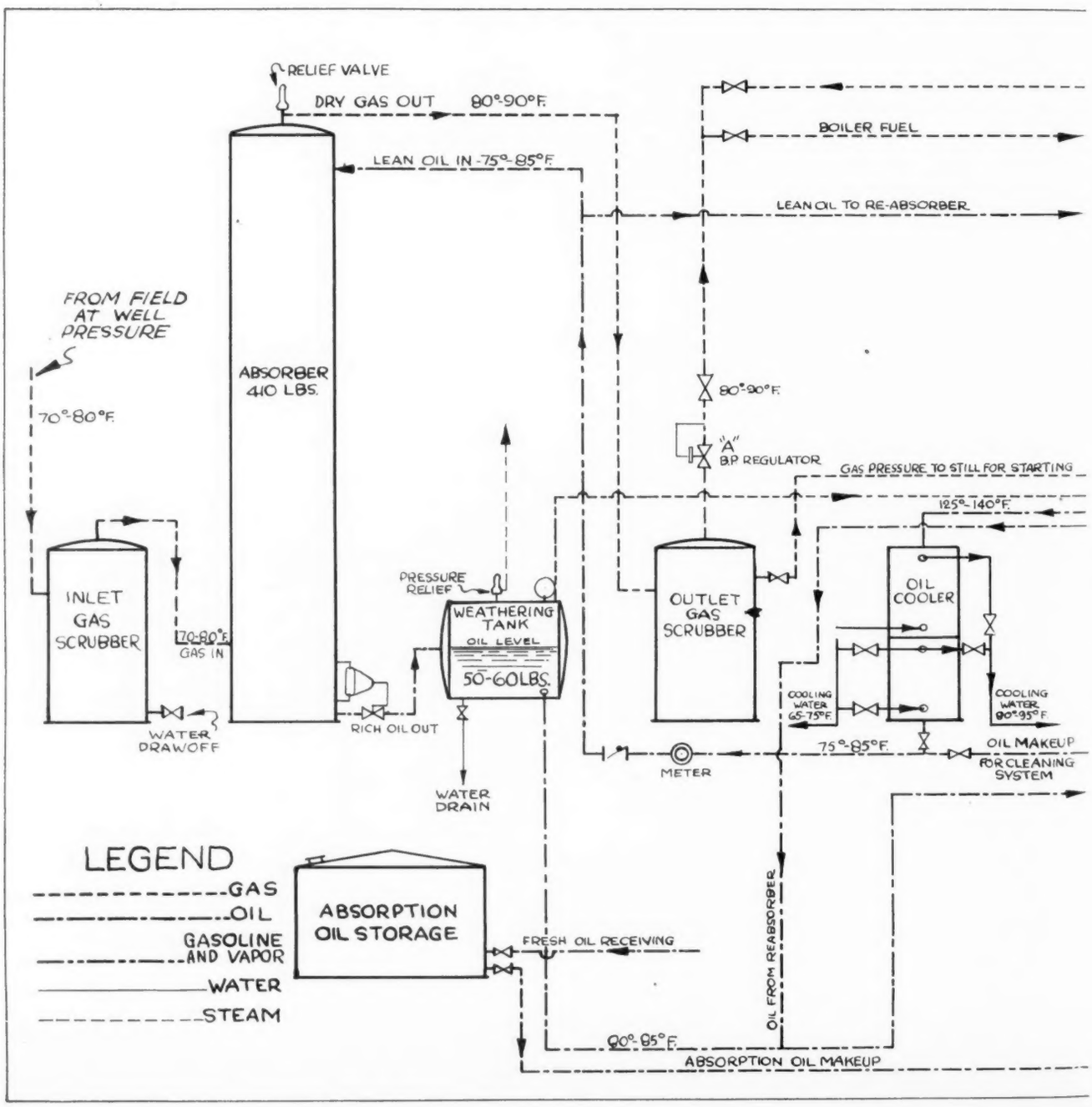
Gas enters the system through the first centrifugal scrubber, at a pressure of 400 to 410 pounds; from this it passes into the bottom of the absorbers, at the rate of ten million feet per day per absorber, and bubbles up through the caps, meeting the absorber oil flowing downward at the rate of about eight gallons per 1000 feet of gas.

A back pressure regulating valve at the top of the tower maintains a vent tank pressure of about 60 pounds, which serves to force the fat oil through the heat exchangers and the preheater into the still. Vent tank gases, and uncondensed vapors from the still are passed through the reabsorber, recovering a considerable amount of stable gasoline and avoiding the necessity of installing a vapor recompressor.

The lean oil for the reabsorber is picked up by a pump from the lean oil line which carries the denuded oil from the stripper to the absorbers. The reabsorber oil level is maintained by a Chaplin Fulton liquid level control, which actuates the throttle of a 6 x 4 x 6 duplex pump taking suction from the bottom of the reabsorber and discharging into the main fat oil line before the latter reaches the exchangers.

Fat oil is pumped to the still under 30 pounds back pressure and the end point of the overhead distillate is governed by open reflux of raw gasoline from the receiving tank, under control of a Tycos automatic temperature control, which actuates the reflux pump steam valve. Condensate is drawn off from two points in the column, and the water accompanying the gasoline is trapped back into the hot well for boiler feed. The lean oil is forced by still pressure through the gravity exchanger, a low pressure pump forces it through the pressure exchanger into the oil cooler and into a surge tank from whence it is returned to the absorbers by the high pressure pumps.

The raw gasoline is rectified in



the fractionator to whatever specifications may be desired. A typical inspection of the rectified gasoline is given below.

A typical specification for absorption oil used in this and similar plants is as follows:

Gravity, API not less than 37.0
Initial Bl. Pt. not lower than 350 F.
Final Bl. Pt. not higher than 600 F.
Viscosity, S.U.V., 200 F., 31 secs.
Vapor pressure, 100 F., mm. Hg., 13 (or lower).
Molecular weight, between 160 and 190.

Extracted gas from absorbers and reabsorber, and the uncondensed vapors from the fractionating unit pass to the boiler room and provide fuel for all purposes. Excess gas is conveyed to the gas distributing lines. Gas feed to the boilers is regulated by a Chaplin Fulton automatic governor which is actuated and controlled by the boiler steam pressure. Boiler operation is entirely automatic and requires only an occasional visit from the operator for inspection of the instruments.

Table I

Gravity, API	90.0
Color	25
Doctor test,	negative
Distillation;	
I. B. P.	60 F.
10%	70
20	80
30	92
40	106
50	122
60	146
70	180
80	240
85	282
E. P.	284
Recovery, total	86.3 %
Residue	1.3
Loss	13.7
Vapor Pressure, corrected....	15.3 lbs.

The boiler equipment consists of two 100 horsepower Casey Hedges return tubular boilers, and one 150 horsepower Scotch Marine boiler, one serving as standby. Water is fed by a 12 x 4 x 10 Worthington pot valve pump, with standby; boiler water level is controlled by automatic apparatus assembled at the plant and consists of a steam trap connected to the water column of each boiler, which operates a common gas regulator in the feed line. Another such regulator in the feed pump steam line regulates the feed pump itself. These regulators are simple in construction, and con-

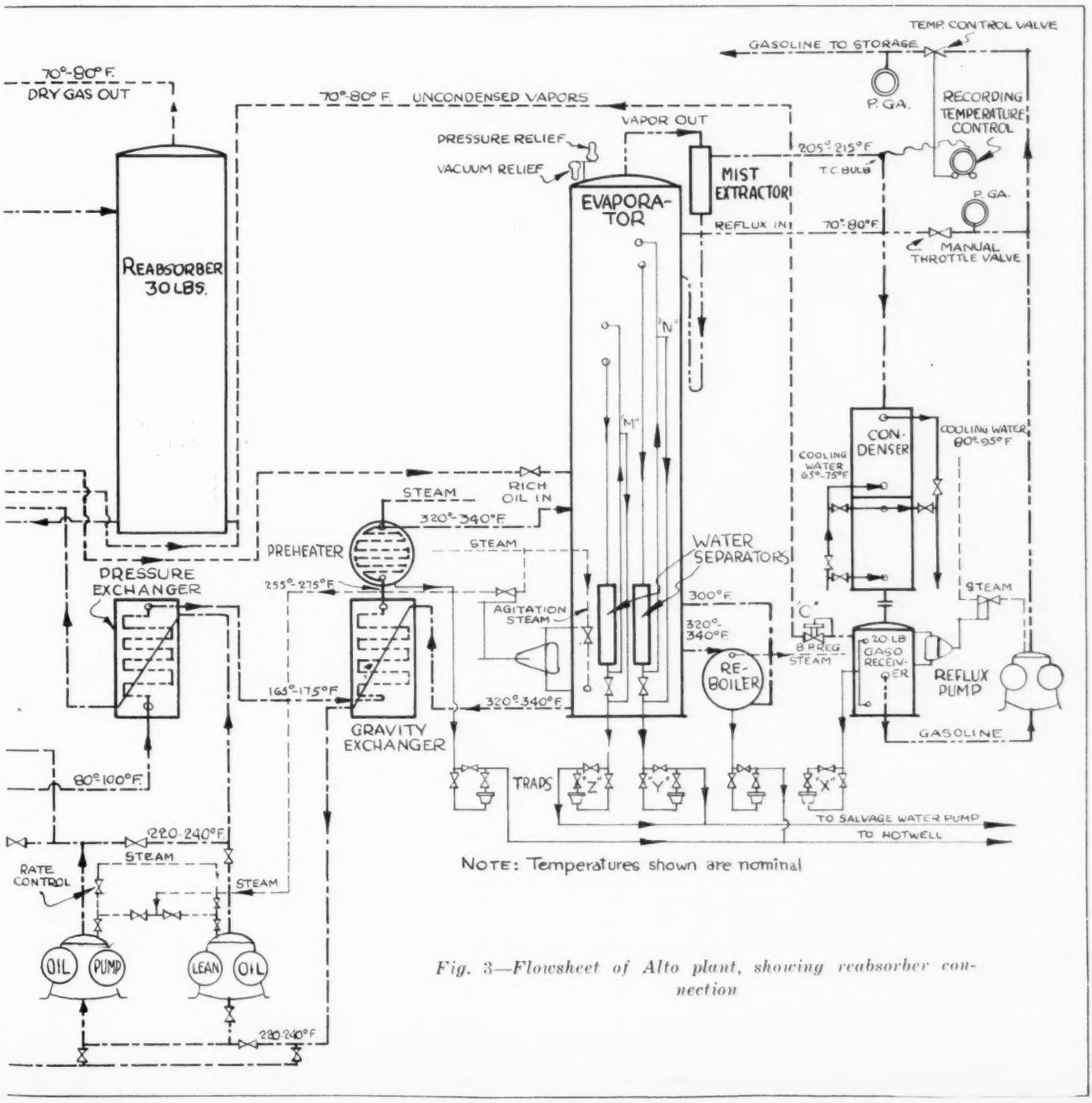


Fig. 3—Flowsheet of Alto plant, showing reabsorber connection

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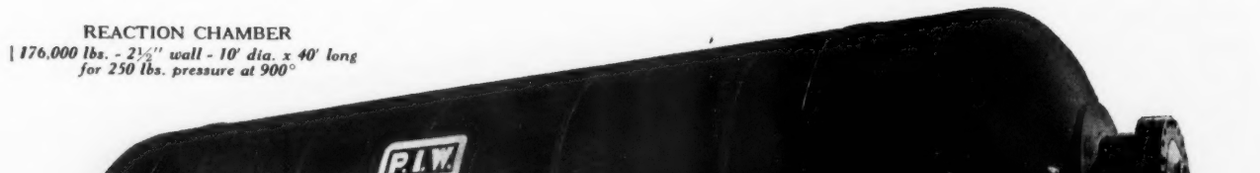

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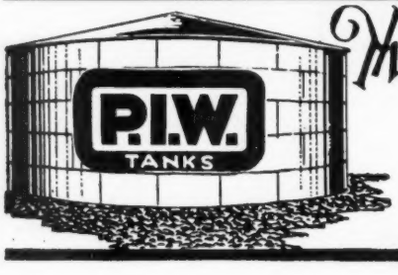

The PETROLEUM IRON WORKS COMPANY
SHARON, PA.
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trol the water level with a maximum variation of ⅜-inch.

Finished gasoline at this plant is pumped through a seamless two-inch all-welded line a distance of nearly five miles to the loading rack. Gasoline production is normally 9000 to 10,000 gallons per day, and to date has been absorbed by the market with very little accumulation.

Carbon black produced in these fields is manufactured by burning dry or extracted gas with insufficient air and recovering the carbon formed. Units of 15 or more sheet iron, enclosed "sheds," eight feet high and 30 feet long or more, are constructed; each shed is equipped with a gas manifold which conveys gas to a large number of small burners, of pipe about ⅜-inch diameter, set vertically in the gas lines branching off from the main supply line down the center of the shed. Only enough air is admitted to the interior of the shed to maintain a smoky yellow flame at each burner, which flames impinge on a "cold" sheet of metal supported a few inches above the level of each bank of burners. These sheets of metal on which the carbon is caught are moved very slowly back and forth over a distance of two or three feet, and a scraper loosens the carbon which falls into a converging trough and into a conveyor line. The carbon is carried into a central conveyor and from there to overhead bins from which it is measured into heavy paper bags by automatic machines, usually containing 25 pounds or more each.

The yield of ordinary carbon black varies considerably in different plants and under different weather conditions but is ordinarily from one to one and one-fourth pounds per 1000 feet of gas consumed. Special blacks, prepared for purposes requiring special properties, show a lower yield, as much as 3000 cubic feet of gas being required to obtain a pound of certain types of black. While under normal conditions carbon black producers have found a ready market for their product, at present stocks in this locality have been increasing. It is expected that greater activity in the industries served, as the season progresses, will absorb this present excess production.

New York Pays $95,500 Gas Tax a Month

NEW YORK, May 15.—New York City motorists paid $286,657 in gasoline taxes during the three months ended March 31, or an average of $95,552 per month.

The 57 counties outside of Greater New York will receive $1,146,630 as their share of the state tax for the same period. Seventy-five per cent of the entire proceeds is retained by the state. The gasoline tax funds are rebated in upstate counties on the basis of unimproved highways.

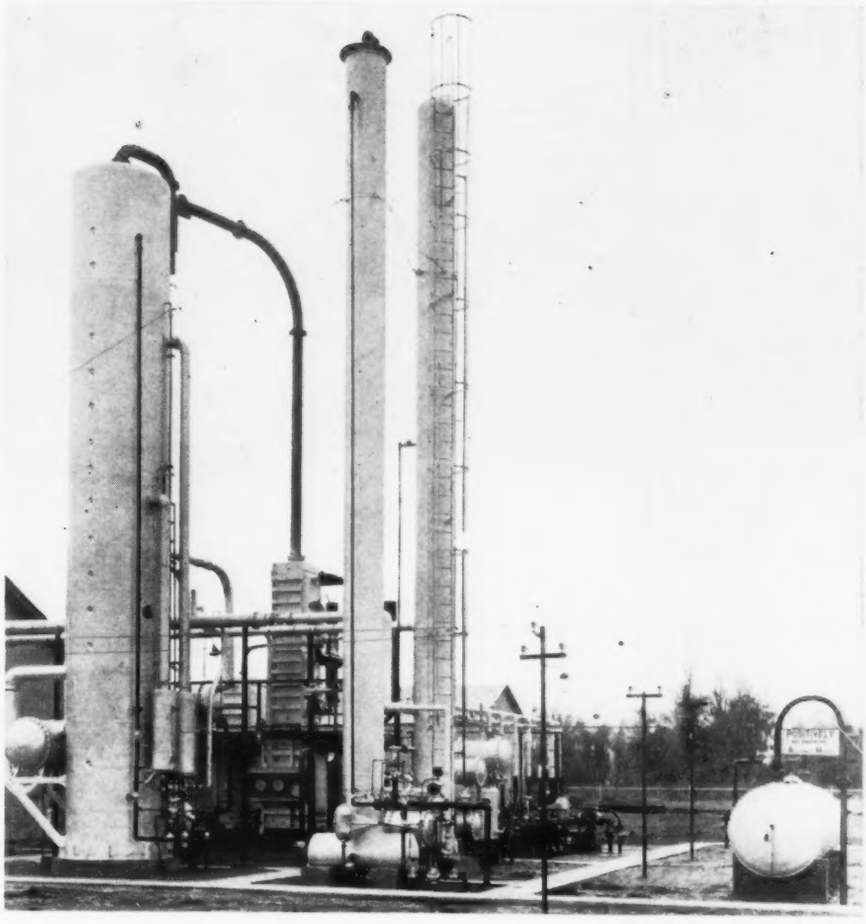

Fig. 2—Still, reabsorber and fractionator at Alto plant

New Refining Patents

Dehydrating Emulsions. U. S. P. 1,754,009, April 8, 1930, John M. Cage, Assignor to Dehydrators, Inc.

THE principle of electrical separation of the components of emulsions has been successfully applied on a commercial scale to the water-in-oil emulsions which are a common source of difficulty in oil refineries. Electrical breaking of emulsons is not new in itself; this invention is an improvement over other electrical methods in that it is more effective and yet has lower operating costs.

The principal feature which has improved the efficacy and lowered the costs of electrical dehydration is the adjustment of applied potential gradient in accordance with the electrical conductivity of the emulsion to be dehydrated. Original emulsions show wide variations in conductivity; and any given emulsion changes in conductivity as its water content changes. The inventor has therefore designed an apparatus in which the potential gradient can be controlled so that it is and remains in inverse ratio to conductivity of the emulsion passing through the apparatus.

This may be accomplished in two different ways; the electrodes may have between themselves a constant potential, their spacing being varied so as to vary the potential applied to the emulsion, or the potential can be controlled by electrical means actuated by the properties of the emulsion. Both methods may be combined in a single apparatus and procedure, thus taking care both of variations in conductivity of original emulsions and of any given emulsion during treatment.

In accordance with the principles governing effective dehydration of water-in-oil or oil-in-water emulsions, the potential is so chosen as to cause only ionic conduction of the current, avoiding formation of conductive water chains. While primarily designed for treating water-in-oil emulsions, the invention is adaptable also

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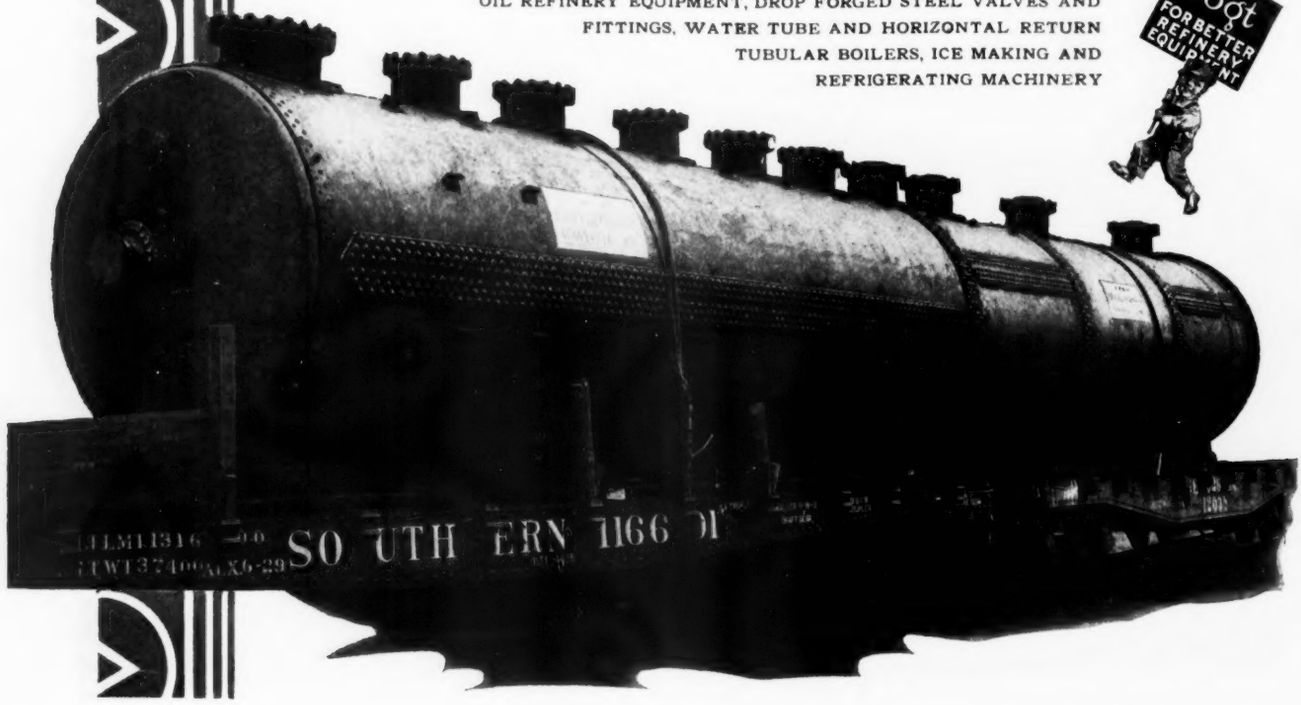

to the breaking of oil-in-water emulsions.

* * *

Treating Oils with Solids. U. S. P. 1,753,859, April 8, 1930, Thos. T. Gray, Assignor to Gray Processes Corp.

THE object of this invention is to effect the treatment of petroleum oils or distillates, at distillation temperatures, with solid treating agents without permitting these agents to become dispersed in or mixed with the oils. This is accomplished within the processing still, which permits economies in operating costs.

To accomplish this, the still is provided with a manhole and with tracks, for entry of fine-mesh wire baskets or containers carrying the solid treating agents. The tracks are so arranged that the containers may be placed in contact with the distillates either in the vapor or the liquid phase. A plurality of the wire baskets may be introduced into the still, with the same or different solid agents, according to the treatment desired.

While the method is adaptable to treatment of any fluid with any solid, it is particularly useful for the desulfurization and purification of petroleum distillates. Among the preferred solid agents are adsorptive clays, which may be metallized to increase their affinity for sulfur. Examples are bauxite, fullers earth and copperized fullers earth. Iron, lead, zinc or manganese, or their oxides or salts may also be used, alone or in mixtures with each other or on adsorptive carriers.

* * *

Apparatus for Cracking. U. S. P. 1,753,769, April 8, 1930, Arthur G. Bogardus, Assignor to Universal Oil Products Co.

THIS invention provides apparatus for use of alternate or inter-connected cracking zones, adapted for cutting in or out any given zone or zones from the system without any danger of leakage of hot oil into a zone which has been cut out. Reduction of pressure in a zone after cutting out is gradual.

Leakage of hot oil is effectively prevented by introducing into the communicating line a balancing liquid, which may be the same kind of oil as the charging stock, but which is kept at a much lower temperature than the oil in the cracking zones. This balancing liquid is kept under pressure at least equal to that which is maintained on the cracking system; it may be a somewhat higher pressure, but may not be lower.

The desired result is accomplished by a valving system inter-connecting, in the simplest case, 3 zones: one in which pressure is maintained on the hot oil under treatment; one in which the same or a higher pressure

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is maintained on the balancing body of cool oil; and a zone of reduced pressure. A pressure accumulator is provided, to compensate for fluctuations and to provide a reserve pressure in case the oil pump stops.

The invention thus constitutes an improvement in the efficiency of operation of a continuous process for liquid phase cracking of heavy oils under pressure, by facilitating the alternate utilization of two or more pressure cracking zones.

* * *

Breaking Emulsions. U. S. P. 1,753,641, April 8, 1930 John W. Beckman.

AS A means of breaking the aqueous emulsions of petroleum encountered in refinery practice, and at the same time of improving the grade or quality of the oil, a novel biochemical method has been developed. It takes advantage of the observation that the emulsifying agents by which such natural emulsions are stabilized are commonly nitrogenous materials which can be utilized by yeasts, molds or other micro-organisms.

A culture is made of the organisms on a cheap nutrient, such as copra meal, fish scrap, cottonseed meal, etc. The seed meals are preferably first subjected to lactic fermentation so that they are rich in soluble amino acids. If bacteria are chosen for the treatment, the nutrient medium should be neutral; if molds are used an acid medium is preferred. The crude oil emulsion is poured over about one-tenth of its volume of suitably prepared culture, and stored for two weeks. The separation of the water is then substantially complete, and the quality of the crude (for refining purposes) is improved as compared with the oil contained in the original emulsion.

COPIES of United States Patents can be obtained at 10 cents each, payable to the *Commissioner of Patents, Washington, D. C.* Coupons, good until used, are sold in books of 100 at $10. Photostat copies of foreign patents (if not of too recent date) can be obtained from the Commissioner of Patents at prices (payable in coupons if desired) which will be quoted on application.

Back-Fire Causes $3,000,000 Loss at Bayonne

International Newsreel Photo

NEW YORK, May 10

FIRE badly damaged the Bayonne, N. J., terminal and refinery of the Gulf Refining Co. May 8. Loss was estimated at $3,000,000.

The fire was started by backfire on a small motor driven tank boat. When it had been brought under control after five hours it had destroyed three piers, 18 tanks with about 6,000,000 gallons of gasoline and fuel oil, warehouse, powerhouse, pumphouse, and several locker houses.

The flames were fought by fire brigades of the Gulf, the Standard Oil Co. of New Jersey, the Tide Water Oil Co., the fire departments of Bayonne, Jersey City, and Greenville, N. J., and fire boats of New York city.

After foam powder of the plant had been exhausted, more powder was brought from the nearby refineries of the Standard and Tide Water and also two truckloads were brought across the state from Paulsboro, N. J., where the Vacuum Oil Co. has a refinery.

All of the 18 tanks exploded and aviators who circled over the burning terminal said flames shot 700 feet into the air and made flying hazardous.

The motor boat, owned by the Fidelity Petroleum Co. of Perth Amboy, N. J., had taken on about 800 gallons of gasoline and cast off from a pier when a back fire is said to have caused an explosion. Flames spread to the pier where oil was ignited and then around drums of aviation gasoline which exploded. One member of the crew of three on the motor boat suffered a fractured knee. Clothes of the two other members were ignited and these men leaped into the water and were rescued.

Smoke covered areas of New Jersey and Staten island contiguous to the fire zone. One of the aviators estimated that smoke rose 6000 feet.

ON THE LAZY BENCH

National Petroleum News

New Old Story

A university professor was calling at the home of a friend, and the latter's small daughter apparently felt called upon to entertain the guest. So she announced she would tell him a story.

"There was once a man named Columbus," she began, "an' a queen sent him on a voyage, an' his ships were named the Nina, an' the Pinta and'—an'—"

"Santa Maria," prompted the professor.

"Yes, an' the queen's name was—"

"Isabella," suggested the professor.

"Say," said the little girl with sudden suspicion. "I'll bet you've heard this story before."

—*The Thunder Bird*

* * *

Gang Foreman: "Say, Boss, can't you hurry up that pipe? Give them welders a kick where it'll do the most good, an' tell 'em I'll have the ditch open clear to the river by tonight."

Superintendent: "Keep your shirt on, Jerry. The pipe-gang is not loafing. Rome wasn't built in a day, you know."

Gang Foreman: "Well—Ptew!—Mebbe so. But I wasn't foreman on that Rome job!"

—*The Piper*

* * *

Tourist: "Can you cash this check for me?"

Village Banker (looking it over): "I ain't got that much, but I'll take you over to the filling station and introduce you."

—*Field Flashes*

* * *

Retort Courteous

Motherly Old Lady (to small boy): "My dear, does your mother know you smoke?"

Small Boy (coldly): "Madam, does your husband know you speak to strange men?"

—*The Loreco Diamond*

* * *

"I couldn't sleep last night because the shade wasn't pulled down."

"Well, why didn't you pull it down?"

Couldn't—the shade was across the street."

—*Barnsdall*

* * *

"What Jones says to his wife goes."

"Yes, all over the neighborhood."

—*The Gas Line*

They Tell This One

A Scottish traveler frequently made the trip between London and Paris. He was such a wretched sailor that even on the calmest days he felt ill.

On a recent trip he went up to the skipper, and, after explaining his plight, said: "Surely, you must know a cure for seasickness."

"Yes," said the skipper, "I know of one that'll cure you."

So he gave the Scotchman a dime and told him to hold it between his teeth.

—*The Gas Line*

* * *

Before History Was Made

Teacher: "Willie, do you mean to say that you can't name all of the presidents we have had? When I was your age I could name them all."

Willie: "Yes, but there were only three or four then."

—*The Gas Line*

* * *

Chinese tung oil extraction is extremely crude.—*News Item.*

Well, we don't know exactly what advice to give about that, except to be nonchalant and light a refinery.

The AMERICAN LEGION Monthly

* * *

Fond Parent: "Do you think you can support my daughter on $150 a month?"

College Grad: "Oh, thank you, sir, that would help wonderfully!"

—*The Piper*

* * *

"Lady," said the beggar, "could you gimme a quarter to get where me family is?"

"Certainly, my poor man," she replied, "here's a quarter. Where is your family?"

And as he edged away he answered, "At de movies."

—*The Gas Line*

* * *

"Is that a rooster cackling?"

"No—those are hens saying their 'Now I lay mes.'"

—*Mid-Continent Petroleum Courier*

* * *

The old-fashioned girl who used to drop her eyes and say, "You must see papa," now has a daughter who says, "Shove her into high, kid! The old man's gaining on us!"

—*The Piper*

* * *

Americanism

Old dad laying bricks at $12 a day and saving money to educate the boy so he can hold a white collar job at $75 a month.

—*The Gas Line*

New Box Type Case

Completely equipped with bottles and jars . . . $15.75

269—A real oil sales case, covered with smooth black cowhide. Lined with red velvet. Case contains fourteen 4-ounce bottles and ten ½-ounce squat grease jars held in position by adjustable bars. Bottles are partitioned separately.

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"*What* company?"

"The Myerrord Company, makers of the new—"

"Just a minute, young man. You may have the best product on the market but you'll never get a hearing for it if you muffle your name like that. People are too busy. They won't take the time to guess what company you represent."

The Name

A C R

"Exactly, Mr. President. That is the point I wanted to make. Every day you let your trucks and tank cars, your road and curb signs, your drums, pumps and cans muffle your name just as badly. And they are competing with the properties of every other petroleum manufacturer. Now, I can help you catch the eyes of every oil and gasoline prospect, and at the same time save you money on your present appropriation."

"How?"

"By discarding all the expensive, confus-

MEYERCORD

ing materials you use now. By doing your whole identification job with a medium so reasonable in price that you can afford to spread your name on every thing used to sell, deliver or dispense your products . . a medium so vivid that you can't tell it from hand-lettering . . a medium so easy to use that any man can apply it in a few minutes. That thorough, uniform medium, sir, is Meyercord Decalcomania Transfers."

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TRANSFERS

Merchandising and Jobbing Ideas Marketers Are Practicing

By E. L. Barringer

N. P. N. STAFF WRITER

MEMBERS of the football team of the university of California at Los Angeles are operating a Union Oil Co. station here, which has been leased to their assistant football coach, F. H. Oster.

Mr. Oster is on the job himself to see that the motoring public, football and studies share equally in the men's time.

The station was opened March 28 and is said to be selling gasoline in excess of the average new station, according to the Union company. Due to the large number of men available for duty, the station personnel is kept up to high standard. Four or five attendants are on duty most of the time.

The station is operated as the Golden Bear Service Station. It has facilities for greasing, washing, battery and tire repair service.

Members of the University of California football squad attract motorists to this service station of the Union Oil Co. at Los Angeles, leased to the football coach.

Kneeling left to right: L. Bergdahl, Ed Austin, Lee Coates, Bob Decker, and Tom Caley. Ready to receive the pass-back is Ed Solomon, quarterback and capt-elect of the 1930 team.

* * *

Training Attendant Today's Problem

Training the personnel is the biggest problem at the service station today says Paul Kempf, secretary of the Staebler Oil Co., Ann Arbor, Mich.

"We have the goods, and we know it," he said. "We have the stations and we spend a lot of time and money on them, both the regular and the super stations. The big problem is to train the men who work at these stations and who are selling good products."

The Staebler Oil Co. has tackled the problem through regular service station meetings, and has gone a step farther. In order that the men may have a thorough knowledge of all departments of servicing an auto each man is sent each year to one of the company's one-stop stations for a week. The attendant absorbs as much knowledge as he can about greasing, tires, batteries and how the big station sells.

The Home Oil Co. in Oskaloosa, Iowa, educates its station men by sending them to the refinery that supplies it, the Champlin Refining Co., at Enid, Okla. Each year a deserving employe is sent to the refinery for a three-day trip at the Home company's expense. If the man has any speaking ability he re-

lates his experiences at a general meeting of the station attendants to help spread knowledge of how the products are refined.

* * *

How Stations Solve Staggered Lubrication

Some oil companies have modified their lubrication appeal to "bring the car in every 500 miles and we will lubricate the parts according to the mileage."

On the surface the job of lubrication seems more complicated with manufacturers recommending certain parts be greased at 500 miles, others at 1000, others at 1500, others at 2000 miles and so on.

Oil companies are following these recommendations, but the men on the grease guns also are applying common sense along with lubrication. Attendants from several companies said they try to follow the charts when they know the car is given regular attention, but they also keep a sharp eye on all places so the job will be thorough.

"I go over every fitting regardless of recommendations," said the attendant at a company operated station of a large company. "When I come to a place I know needs grease only every 1500 or 2000 miles I give it an easy shot. If the fitting is all right no harm has been done, but if it is dry I fill it up. Recommendations are all right, but many drivers get a greasing when they feel like it so we cannot follow instructions to the letter."

* * *

Preparedness Practiced in Fuel Oil Storage

An industrial plant in Columbus O., believes in preparedness—against another shut-off of its natural gas supply, and for the past 10 years has kept 300,000 gallons of fuel oil in storage at the plant.

Shortly after the World war the natural gas supply was shut-off and the plant had to find some available fuel oil to keep operating, and to find it quickly. At the time the company stood to drop thousands of dollars in profits in case of a plant shut down.

The fuel oil was found, but officials decided not to place themselves open to a similar situation. The yard was dug up and concrete oil storage buried. The 300,000 gallons of fuel oil was placed in the tank, and still remains there in case of an emergency.

* * *

Flow Chart Has Sample Of Finished Goods

The Standard Oil Co. of Indiana has worked up a small flow chart with a small sample bottle holding the finished product to be used by salesmen in giving lectures. The chart fits a leather case, about the size of a small over-night bag. Salesmen can tell about the various cuts in refining crude oil, and the sample bottle shows the finished goods.

Oil Merchandising

An average of eight articles per month have been published in National Petroleum News the past ten months on oil merchandising problems.

Here are 75 of the more important ones that have appeared since last August on how oil companies sell their goods:

1930

Retreading tires and special polish jobs bring profits May 7, p. 90
How stations feed business to one-stops May 7, p. 38
Tourist camp stations built like Dutch windmills April 30, p. 105
Tire changing and drugs profitable April 30, p. 88
Women marketers attract customers with flowers April 30, p. 85
Solvents only sold at bulk plant April 23, p. 24
Advertising premium goods helps sales April 16, p. 83
Merchandising motor oil thru glass bottles April 16, p. 91
Attracting customers with Mardi Gras costumes April 16, p. 102
Selling to women thru specially designed station April 9, p. 89
Selling to rural customers, what not to do March 26, p. 83
How aviation products are sold March 19, p. 139
Motorist hotels built for service station customers March 19, p. 153
How customer ownership plan helps sales March 19, p. 161
Tank wagon salesmen! Know your products and territory March 19, p. 171
Increasing sales by telling motorists where to fish, camp, etc. March 19, p. 195
Salary, commissions or both to station men to spurt selling? March 19, p. 217
How to sell women—pointers that help sell March 19, p. 223
Merchandising jobbing ideas practiced by marketers March 12, p. 71
Services sold by appointment and contract March 12, p. 75
Salesmanship: training men March 5, p. 69
How one station sells 1,000,000 gals. gasoline in 1 year March 5, p. 79
Display goods to create demand Feb. 26, p. 33
"Ticklers" keep lube customers coming for $500 a year Feb. 26, p. 85
Station men and appearance of vital importance in selling Feb. 19, p. 21
Elephant advertises new gasoline brand Feb. 12, p. 81
Bargain basement is clearing house for odd, slow-moving equipment Feb. 12, p. 36
Road service truck boosts sales Feb. 12, p. 88
Outposts get business for one-stop Feb. 12, p. 91
Merchandising-jobbing ideas of marketers Jan. 29, p. 77
Showmanship used in selling gear grease Jan. 22, p. 96
One-stop uses all space to profit Jan. 15, p. 67
Merchandising talks Jan. 8, p. 78
Home-owned company is sales getter Jan. 1, p. 73

1929

Merchandising ideas for marketers Dec. 25, p. 97; Dec. 18, p. 96
Sign posts get tourists to stop Dec. 11, p. 109
Personal calls are effective sales builders Dec. 11, p. 118
Broader merchandising at one-stops Dec. 4, p. 99
Salesmanship, series of articles on: Disarm customer first, Nov. 27, p. 101; Knowledge of credit responsibility, Oct. 9, p. 97; Ability to see mechanical ills, Sept. 25, p. 161; Tactful meeting of customers' complaints, Sept. 4, p. 91; Keeping old customers and getting new ones, Aug. 28, p. 91; Selling from the truck seat, Aug. 14, p. 101.
Mail orders take sales from neighborhood station Nov. 20, p. 85
Small town station does 22 greasing jobs daily Nov. 13, p. 24
Anti-freeze compounds help station sales Nov. 13, p. 26
Servicing cars in club atmosphere Nov. 13, p. 77
Gasoline is 55% of sales at one-stop station Nov. 13, p. 89
Gardens are sales help, prize winner says Nov. 6, p. 75
Personal calls bring station business Nov. 6, p. 79
Gasoline distribution as retailing expert sees it Nov. 6, p. 84
First hotel for motorists opened by Pierce Oct. 30, p. 57
Airplanes used in selling Oct. 30, p. 263
How window displays at stations sell customer Oct. 30, p. 288
Appealing to customers with indoor lubrication Oct. 30, p. 296
Picks oil he'll sell only after road tests Oct. 30, p. 320
Merchandising talks Oct. 30, p. 323
How do you label containers on small gasoline sales? Oct. 30, p. 329
Personal attention brings 2,000 cars a month to tiny lube station Oct. 30, p. 331
"Kicks", salesmanship, direct mail, build 200,000 gallon business Oct. 23, p. 72
50% of domestic oil sales renewed by mail Oct. 16, p. 83
Automatic merchandisers boost station profits Oct. 16, p. 41
Seven talks on profits in marketing Oct. 2, pages 101, 105, 107, 109, 111, 115 and 116.
90-day battery guarantees gets friends for one-stop station Sept. 18, p. 83
Free powder puffs attract women drivers Sept. 11, p. 100
8 pointers on how to build grease sales Aug. 28, p. 100
How marketer brought gasoline gallonage to 1200 a day Aug. 21, p. 86
Tire company links beauty with quick service Aug. 14, p. 96
Will beauty shop at filling station bring more business Aug. 14, p. 106
Bus terminal-filling stations opened Aug. 7, p. 35
Straight line moving platform speedy for car washing Aug. 7, p. 92
Encloses pits now for winter profits Aug. 7, p. 101
Floating bulk station sells oils on Lake Aug. 7, p. 102

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Note: Material used in this column is principally taken from the newspapers. NATIONAL PETROLEUM NEWS assumes no responsibility for its accuracy.

The list as published from week to week cannot be looked upon as indicative of the relative extent to which stations are being built in various parts of the country.

Cloquet, Minn.—C. A. Carlson, filling station.
Oneida, N. Y.—Standard Oil Co., filling station.
Minneapolis, Minn.—Shell Petroleum Corp., service station.
Minneapolis, Minn.—Lundberg-Carlson Garage., service station.
Grand Forks, N. D.—C. A. Brolin, filling station.
Garrison, N. D.—Farmers' Union Petroleum Assoc., bulk station.
Waterford, Minn.—A. F. Howland, filling station.
Quinn, S. D.—White Eagle Oil & Refining Co., filling station.
Beaumont, Tex.—Humble Oil & Refining Co., filling station.
Paris, Ark.—Transcontinental Oil Co., filling station.
Beeville, Tex.—Gulf Refining Co., filling station.
St. Louis, Mo.—Standard Oil Co., filiing station.
Salina, Kan.—White Eagle Oil & Refining Co., service station.
Newton, Ia.—Cities Service Oil Co., filling station.
Sheridan, Wyo.—Shell Oil Co., service station.
Piqua, O.—Standard Oil Co., service station.
Strasburg, O.—W. H. Barnhouse, service station.
Marion, O.—Firestone Tire & Rubber Co., service station.
Mount Morris, N. Y.—Standard Oil Co., service station.
Syracuse, Kan.—White Eagle Oil & Refining Co., service station.
Concordia, Kans.—Continental Oil Co., service station.
Des Moines, Ia.—Shell Petroleum Corp., service station.
Cedar Rapids, Ia.—Skelly Oil Co., service station.
Oskaloosa, Ia.—Cities Service Oil Co., service station.
Baldwin City, Kans.—Skelly Oil Co., filling station.
Pratt, Kans.—Orville, Shrack, filling station.
Osceola, Ia.—H. N. Persels, filling station.
Rock Rapids, Ia.—Shell Petroleum Corp., service station.
Audubon, Ia.—Cities Service Oil Co., filling station.
Audubon, Ia.—Standard Oil Co., filling station.
Davenport, Ia.—F. F. Gadient, filling station.
Davenport, Ia.—Mrs. M. Wenzel, filling station.
Livingston, Mont.—Standard Oil Co., two service stations.
Fort Benton, Mont.—H. LaBarre, service station.
Windon, Minn.—Pioneer Oil Co., filling station.
Dubuque, Ia.—Firestone Tire & Rubber Co., service station.
St. Paris, O.—F. A. Zimmer, service station.
Jackson, O.—Gettles Bros., filling station.
La Cross, Wis.—Firestone Tire & Rubber Co., service station.
La Crosse, Wis.—Shell Petroleum Corp., bulk station.
Cuero, Tex.—Gulf Refining Co., filling station.
Estherville, Ia.—Standard Oil Co., filling station.
Maquoketa, Ia.—Harris Penrose, filling station.
Newton, Ia.—Cities Service Oil Co., filling station.
Bozeman, Mont.—Standard Oil Co., filling station.
Mobridge, S. D.—White Eagle Oil & Refining Co., service station.
St. Paul, Minn.—White Eagle Oil & Refining Co., 2 service stations.
Owatonna, Minn.—White Eagle Oil & Refining Co., service station.
Meriden, Conn.—Cities Service Oil Co., filling station.
Wilkinsburg, Pa.—Stanley Johnson, service station.
Brighton, N. Y.—Sunshine Oil Co., filling station.
West Brighton, N. Y.—B. G. Eadie, filling station.
Buffalo, N. Y.—Giesecke-Kinsey Co., filling station.

Shinnston, W. Va.—Sinclair Refining Co., filling station.
Marion, O.—C. F. Lusch, filling station.
Steubenville, O.—William Kincaid, filling station.
Youngstown, O.—National Refining Co., filling station.
Exeter, Mo.—Missouri Farmers Assoc., bulk station.
Tulsa, Okla.—Oliver-Davis Oil Co., filling station.
Devine, Tex.—Magnolia Petroleum Co., filling station.
Sac City, Ia.—Ralph Herrold, filling station.
Clay Center, Kan.—Continental Oil Co., filling station.
Maryville, Mo.—Standard Oil Co., filling station.
Pikeston, Mo.—Continental Oil Co., filling station.
Pikeston, Mo. — Mid-Continent Petroleum Corp., filling station.
Sublette, Kan.—Champlin Refining Co., filling station.
Lake Placid, N. Y.—Standard Oil Co., filling station.
West Hempstead, N. Y.—Charles Botsch, service station.
Altoona, Pa.—Standard Oil Co., service station.
Johnstown, Pa.—Sun Oil Co., filling station.
Fall River, Mass.—Mrs. Helene Perron, filling station.
Miami, Fla.—Orange State Oil Co., filling station.
Bradford, Pa.—Kendall Refining Co., filling station.
Cambridge, Minn.—Albert Medin, filling station.
Blackduck, Minn.—Glen Squires, service station.
Mountain Lake, Minn.—Home Oil Co., service station.
Manhattan, Kan.—C. C. Byers & W. E. Davis, filling station.
Emporia, Kan.—Rumsey & Young, service station.
Kenedy, Tex.—Humble Oil & Refining Co., filling station.
Welch, Okla.—Clay Headlee, filling station.
Lincoln, Neb.—Elmer Leichti, filling station.
Waverly, Ia.—Standard Oil Co., service station.
Reynolds, N. D.—George Duis & E. E. Lycke, filling station.
Wyomissing, Pa.—Standard Gasoline Co., Inc., bulk and service station, at Palmyra, Pa.
East Abingdon, Va.—Gulf Refining Co. of Pa., distributing station.
Muscatine, Ia.—Standard Oil Co., filling station.
Traer, Ia.—J. Seda & S. Seda, filling station.
Dawson, Ia.—Dawson Oil Co., filling station.
Omaha, Neb.—National Refining Co., service station.
Bozeman, Mont.—Standard Oil Co., service station.
Mitchell, S. D.—Standard Oil Co., distributing station.
Watertown, S. D.—Hanson Auto Electric Garage, service station.
Brooklyn, N. Y.—Zucker & Brickner, filling station.
Minneapolis, Minn.—Skelly Oil Co., service station.
Clearwater, Minn.—Henry Bailey, filling station.
Stewartville, Minn.—Home Oil Co., service station.
Mandan, N. D.—White Eagle Oil & Refining Co., filling station.
St. Paul, Minn.—J. B. Reilly, service station.
Canby, Minn.—White Eagle Oil & Refining Co., bulk station.
Canby, Minn.—Pure Oil Co., bulk station.
Owatonna, Minn.—Steel County Oil Co., service station.
Fargo, N. D.—Standard Oil Co., filling station.
Farmingdale, N. Y.—Mr. Hulse, filling station.
Oil City, Pa.—Continental Refining Co., filling station.
Manhasset, N. Y.—Henry Broer, filling station.
Elizabeth, N. J.—Gulf Refining Co., filling station.
Columbia, Pa.—Atlantic Refining Co., service station.
Carnegie, Pa.—Walrath Chevrolet Co., service station.
Brookings, S. D.—Standard Oil Co., filling station.
Minneapolis, Minn.—R. G. Coyne, filling station.
Houston, Minn.—Abraham Bros., filling station.
Mason City, Ia.—Grace E. Woodward, filling station.
Mankato, Minn.—Standard Oil Co., office and service station.
Elk Point, S. D.—The Texas Co., filling station.
Topeka, Kan.—The Texas Co., service station.
St. Louis, Mo.—Lubrite Refining Co., filling station.
Miltonvale, Kan.—Standard Oil Co., service station.

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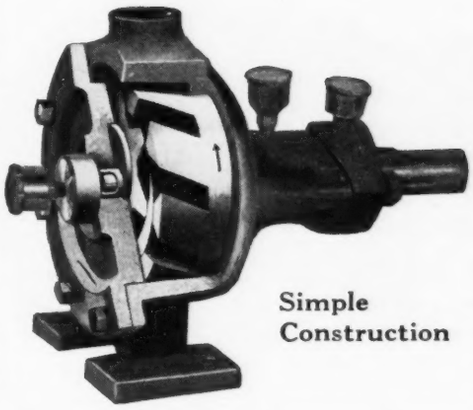

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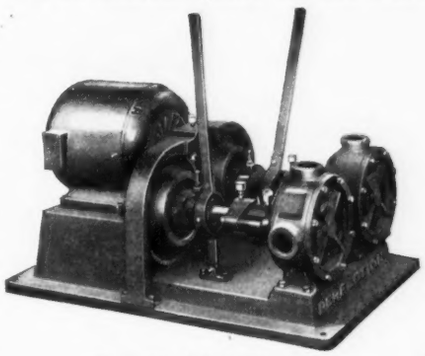

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Los Angeles, Cal.....1031 So. Broadway

Automotive Transportation Items

STANDARDIZATION of automotive equipment for the oil industry will be considered by the eastern section of the American Petroleum Institute Automotive Transportation Group at a meeting to be held at French Lick Springs, Ind., May 26. The meeting is to be held in connection with the summer meeting of the Society of Automotive Engineers.

H. W. Kizer of The Texas Corp., chairman of the eastern group, will preside at the meeting and receive reports from sub-committees appointed at the Jan. 20 meeting at Detroit.

A. W. Kenerson of the Standard Oil Co. of Ohio, will report on tank standardization. P. P. Pierce of the Vacuum Oil Co., will report on standardization of fifth wheels. J. F. Winchester of the Standard Oil Co. of New Jersey, will report on chassis detail. A report on motor transportation regulations will be made by G. H. Sickels of the Mexican Petroleum Corp., Providence. Each of the men named is chairman of the eastern sub-committee on the subject indicated.

BARTLESVILLE, May 15

THAT drivers of company automotive equipment may be in no doubt as to their duties and responsibilities, the Indian Territory Illuminating Oil Co. has issued a manual which has been given to all of them. To make certain that nobody was missed in the distribution, each man is required to sign a receipt. In this he promises to read the manual and to keep it in his possession.

This company has set up strict requirements as to the type of man who is permitted to drive a company vehicle. No man who is physically disabled or unfit to drive may get behind the wheel, of course and the company also looks into his temperamental fitness. If he is nervous or absent-minded he is also barred.

Color-blindness is a barrier. Unless his eyesight is as good as 30/30 in one eye and 20/40 in the other without glasses he is not qualified. It is provided that if the man's eyesight is 20/30 or better with glasses, the requirement may be waived by the department head in charge of the man.

The drivers record is examined. If he has had a number of auto accidents indicating faulty driving, if he has ever been convicted in court for reckless or careless driving or for driving while intoxicated, he is "out." He must show good judgment in the care of his vehicle and he must be at least 18 years old.

Here are some of the specific instructions the company gives to drivers, all of common knowledge but frequently disregarded:

Roy F. Fike

Chairman of the central states division of the American Petroleum Institute Automotive Transportation Group which met at Tulsa May 5 and 6. Mr. Fike is head of the motor transport department of the Mid-Continent Petroleum Corp. at Tulsa.

"Watch tire pressures.

"Check battery acid every two weeks.

"Check radiator regularly.

"Keep car clean. Keep dirt and mud out of shackles and other bearings. After washing your car, have it thoroughly greased.

"Always know how much oil you have in the motor. Change your oil regularly at 500-mile intervals. Keep your car well lubricated.

"To start a cold motor, pull the hand throttle about one-third open, pull out choker if the weather requires and step on the starter, turn the motor two revolutions and then turn on the switch. This starts the oil circulating and fills the combustion chambers with gasoline mixture ready for easy starting. Release the choker gradually as soon as possible, keeping the motor running. Do not race the motor to warm it up. Run the motor at normal speed for about a minute before putting the car in motion.

"Always start a car in low gear. . . . Do not drive faster than 35 miles per hour for the first 10 miles, as it takes about this long for the motor to warm up.

"Use second gear and low gear for the hard pulls. Do not force your car to labor in high gear just because it hurts your pride to change gears. Never 'slip' the clutch in order to make a hard pull in high gear—shift to second or low.

"Do not allow your foot to ride on the clutch pedal—put it on the floor.

"Do not disengage the clutch except to change gears. Never throw the car out of gear on steep inclines, but shift to second or low gear and let the motor help the brakes hold back the car.

"Do not rush at stop signs and jam on the brakes—let the motor slow you down for stops."

The manual contains several pages under these headings: Road Regulations and Courtesies, Car Expense and Accounting, Traffic Regulations of Oklahoma and Use of Vehicles on Paved Highways. The latter two headings summarize the state laws. Rules of the Road are specific as to the points of safety and courtesy to be observed.

In the meeting recently of the American Petroleum Institute central committee on automotive transportation, held in Tulsa, copies of the Indian Territory company's manual was distributed along with copies of the so-called Hoover code of highway regulation. It was agreed to study the two and possible compile a manual for general distribution among truck operating oil companies.

The Gulf Refining Co. recently placed an order with the White Co. for 100 trucks of various models. When these vehicles are added the Gulf fleet will consist of 2336 Whites, the largest standardized fleet in the country.

In 1911 the Gulf placed its first order for a White. There now are 416 trucks with mileage records in excess of 100,000 miles each. The present order for 100 trucks is said to set a record for 1930 motor vehicle sales to a single customer.

ADVERTISING PAGES REMOVED

One-stop service station of Prather-Bowen, Inc., at Indianapolis. Neon lights are used on the sign above the pump island canopy and around the canopy. Left to right departments are: Sales and waiting room, pump men's and oil supply room; tire repair shop, tire and battery service stalls; brake service stalls; wheel aligning and axle department, washing and polishing, and lubrication. There is a free-wheel car lift in the court in front of the lubrication department which can be used for lubrication, tire or brake service

Super-Service Means Super-Personnel: One-Stop Owner Tells Why

By Roger B. Stafford
N. P. N. STAFF WRITER

INDIANAPOLIS

SUPER-SERVICE is mainly a problem of super-personnel. This is the opinion of Clinton C. Prather, president of Prather-Bowen, Inc., owner of a one-stop automobile service station in Indianapolis that is sometimes described as one of the best in the middle west. Mr. Prather was sales manager of the India Tire & Rubber Co., Akron, until he decided a year and a half ago to establish a business of his own. He opened this station last fall.

Mr. Prather prefers to call his station at 24th and Meridian streets, a super-service station although in his advertising he carried this one-stop, four-syllable sentence, "One call does all."

"To succeed in super-service one must have a super-personnel," he told NATIONAL PETROLEUM NEWS. "Unless there is good service a business will be killed. I would rather have 15 good men at this station than 30 mediocre men." His organization comprises 21, including two office employes, two saleswomen, two full-time outside salesmen, himself as manager and part time salesman, and 14 station salesmen and service men.

Personality of the employes and the type of service given, will make or break a station, particularly one which has no years of goodwill behind it, he believes. The work of the outside salespeople and the station's advertising can be wasted unless the station itself backs up this work and advertising with a quality selection of merchandise and a type of super-service that will be remembered by the customer.

The many little courtesies which make up a large part of super-service, said Mr. Prather, must be given cheerfully. The giving must appear to be voluntary even though the management requires it. The employe must not accept a tip; that puts him in the menial class. If he is offered a tip for some seemingly unusual service, he must decline it with, "Thank you, but this is part of Prather-Bowen service."

Salesmen and service men must meet the customers with smiles in their voices as well as on their faces. They must be alert and if they are so engaged that they cannot wait on an arriving customer immediately, they must tell the customer that they will be with him or her in a minute or two.

And from the management's side the men must be versatile. Most of the service men must be able to work in more than one department. Exceptions to this rule are probably only the wheel and axle man, the tire rebuilder, and battery repair man. Pump men, however, are not required to perform any task that would make them unpresentable to the most fastidious woman customer.

In order to get a good personnel Mr. Prather is paying higher salaries than are ordinarily paid service station attendants. He demands that the men who contact the public—the men who impart to the public its impression of the enterprise—shall have sales ability and that his mechanics shall know their work and perform it thoroughly.

Mr. Prather divides purchases at his station into two general classes: convenience purchases of motorists, and premeditated purchases. The first classification includes gasoline, oil by the quart and possibly some refills.

The second is the other merchandise and services which at the Prather-Bowen station includes tires and tire repairs, batteries and battery repairs, lubrication, washing, polishing, simonizing, lacquer rub-out, wheel and axle alignment, and tire and battery road service.

When a new station is opened, he said, especially by a new concern like his was to Indianapolis, the convenience purchases predominate. As the oil and gasoline sales increase and the station becomes better established the volume of premeditated purchases increases and at a faster rate than the convenience purchases. An alert, courteous and skilled personnel is the important factor in increasing the volume of premeditated purchases which are, in a final analysis, the result of the pleasant, previous experiences of motorists at a station.

In Indianapolis Mr. Prather finds that tires and tire service make up 35 to 40 per cent of the gross dollar volume of the station's business, and petroleum products make up a like amount. The remainder of the services comprise 20 to 30 per cent of the gross.

No barber shop tactics are permitted in selling the diversified services. The attention of the motorist may be called to the various services and there is consistent newspaper and direct mail advertising backed up by the sales force of two men and two young women and Mr. Prather.

The outside salesmen spend most of their time selling tires. Commercial business can be obtained only by direct solicitation. Tires for privately owned cars may be sold as a result of contacts at the gasoline pumps or the lubricating and wash racks.

Individual car owners are appraised of the various services by direct calls of the saleswomen at their homes. This sales effort has been concentrated in the best residential district of Indianapolis which lies north of the station. The station is about two miles north of the retail business district of the city and on the southern edge of the best residential district.

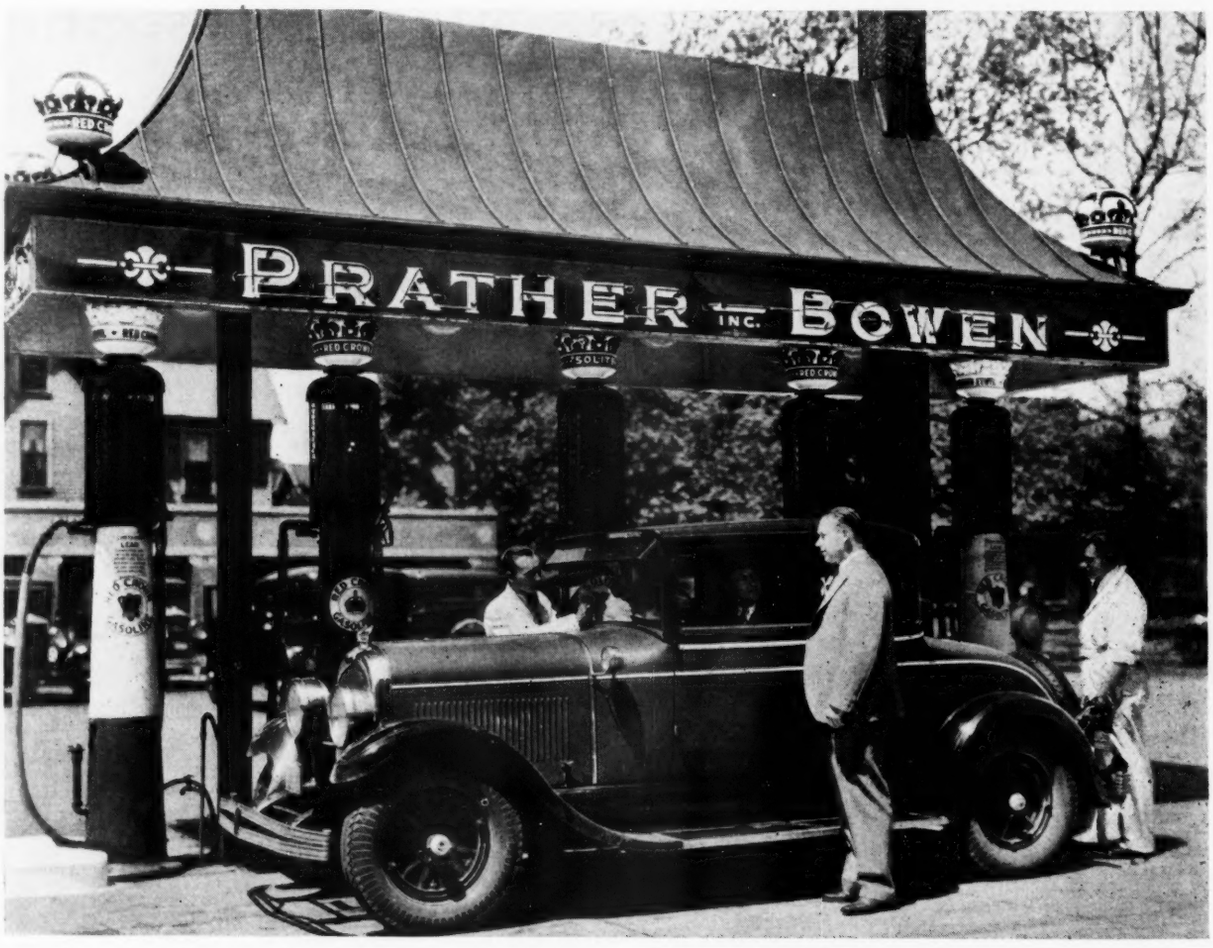
In this residential district are about 10,000 homes whose owners represent the bulk of the wealth of Indiana's capital. It is at these homes that the saleswomen call to explain the Prather-Bowen service but not to make any direct sales.

The station has a card file of every

5 Essentials in One-Stop Station Operation

HERE are five essentials to successful super-service, one-stop station operation in the opinion of Clinton C. Prather, of Prather-Bowen, Inc., Indianapolis:

1. Personnel—Cheerful, smiling, alert and courteous assistants.
2. Convenient location of station with easy entrance.
3. Quality of products—those well recognized in the community the station serves.
4. Selection of equipment—most improved tools are required to give quality service.
5. Expert and thorough workmanship on all mechanical or partly mechanical service.



Clinton C. Prather, president of Prather-Bowen, Inc., greets a customer while two gasoline and oil salesmen fuel the car and wipe off the dust. Mr. Prather is a tire man primarily. He was trained by Goodyear and was sales manager for India before he built this station last year

automobile ow[illegible] saleswomen carry no portfolios in calling on homes but have only a quantity of the cards from the file, which contain details about the make of car or cars owned in the family. The young women do not have the appearance of the usual house to house canvasser, and, therefore, they get answers to probably more calls than if they appeared to be selling something when they rang the doorbell.

When the call is answered, the saleswoman inquires if it is Mrs. Young or whatever the name of the matron might be. If a servant answers the call the saleswoman inquires for her mistress.

"I'm Miss Smith of Prather-Bowen," the saleswoman introduces herself. "I do not wish to sell you anything but I do wish to tell you about our automotive service." She then tells her story of the Prather-Bowen diversified service and she is rarely treated discourteously.

Late in the day, the saleswoman

Kin Hubbard (Abe Martin) Writes of Horse and Motor Ages To Advertise Modern One-Stop Service Station

Bloom Center in 1896

KIN HUBBARD wrote his first advertisement last fall for the Prather-Bowen, Inc., station in Indianapolis. His famous character, Abe Martin, with his pithy and philosophic comment, for many years an institution of the Indianapolis News, has in recent years become widely known through syndication. Abe tells in the one advertisement, reproduced here, of Bloom Center in 1896, then in the heyday of the horse age and what is expected in the way of service today in the motor age.—Editor.

WE'VE certainly traveled some since the feller who owned a hoss an' phaeton an' stone hitchin' post wuz cock of the walk. Those wuz the good ole days, the pedestrian age, we hear so much about—the days when we could walk fer miles without gittin' killed, when we never looked up an' down the street unless we wuz expectin' a circus parade, when the word "service" wuz unheard of, when our grocer didn' even help us shoulder a sack of flour after we'd bought it.

Who'd want to return to the "good ole days?" Who'd want to chop stove wood an' split kindlin,' an' try to read the Bible by candlelight, an' who'd want to carry corn meal an' mackerel right through the principal streets of our home town, an' who'd want to wait till summer to wash all over, or sit down to dinner with whiskers on? Who'd care to go back to the days when the leadin' banker took care of his horse, greased his buggy with castor oil an' a feather, cleaned the stable out, an' showed up at the bank at 8 a. m. smellin' like spavin liniment?

Next to a feller who wuz'n raised in a little town I have the most pity fer the feller who didn' live in the horse an' buggy days when we used to be afraid to drive near the railroad, when we paid some loafer a dime to hold our horse while we bought a nickel cigar. Horses have to be shod an' fed an' scrubbed an' clipped an' doctored. They are subject to heaves, epizootic, stringhalt, an' colic. Talk about a squeaky auto door or a loose shackle bolt, one should have driven a horse that was full o' white clover or had the heaves. A horse would keep us at home because they have to be fed an' watered like a canary. We kin loan a canary or leave it with an aunt, but neither friend or kindred would care to keep our horse while we wuz in Nice or Chicago. I recall how folks used to talk all winter about drivin' away out to Uncle Charlies, nine miles, when the weather got nice. But what I want to talk about is automobile service, really gettin' a car serviced when you order it serviced. It is estimated by those who have occasion to cross the street now an' then that ther's 27,000,000 automobiles in action today, or 11,000 automobile owners today to one horse an' phaeton owner 30 years ago. An' fer ever' leadin' banker who boasted of ownin' a horse an phaeton, or the next greatest luxury—a lawn mower 30 years ago—ther's 11,000 fellers today who wouldn't think o' walkin' two blocks whether they're bankers or carpenters. We all have cars if we haint got nothin' else an' we're all lookin' for service, a place where we don't have to stand around an' watch to be sure we git service.

While a lot o' car owners trade in after the first year there is no limit to the life of an automobile if it's properly lubricated, kept tightened up an' adjusted, the wheels lined up an' the body washed and polished. An' ther is no limit to the life o' tires if they are of the right make an' properly mounted an' inflated an' a sledge hammer haint used when they're changed.

The auto is the greatest single factor today makin' fer the happiness of the nation. It has made it possible fer the rich an' the insolvent alike to enjoy life. But it's got to be serviced an' service is like mushrooms, an' "If you want mushrooms you've got to go where mushrooms is," as the lark said.

Laughter makes the whole world kin. Every Ike Lark, Tawney Apple, Ez Pash and Fawn Lippincott in town is hereby invited by Prather-Bowen to visit us here at Indiana's finest new super-service station. Drive in—look about, see how the old surrey is kept shipshape nowadays in the tempo of 1929.

The Job of the Jobber is to Be Prepared.
Now is the time to order

TRADE MARK
FISKE'S

DARK GEAR and TRANSMISSION LUBRICANT
For Warm Weather Use

Insure your Customers' good will by supplying this fine quality Gear Lubricant. It is one you can sell with enthusiasm for it will always support your complete confidence.

There is a 60 year's old organization with an enviable record to sustain, back of this product.

Many Jobbers find satisfaction and an attractive profit in handling this lubricant under their own brand.

We have an interesting offer to make to established Jobbers who are in a position to handle this quality line.

3 Densities: Light, Medium, Heavy
Drums of 100, 200, 400 lbs.

There is a Fiske quality lubricant for every Automotive and Industrial purpose.

FISKE BROTHERS REFINING CO.
24 State Street, New York

Newark, N. J. - - - - *WORKS* - - - - Toledo, Ohio
Established 1870

A big fleet of *modern* cars;
4 large, privately owned shops to keep them in condition;
18 years' specialized experience;
SPECIAL *services to shippers, described on request. Address*

NORTH AMERICAN CAR CORPORATION
327 S. LaSalle St., Chicago, Ill.
Tank Cars for Lease. Domestic and Export Terminals Chicago, Tulsa, New Orleans.

reports on her work, on whom she has called, and the results. In the evening Mr. Prather or a salesman calls the husband or father and thanks him for the courteous attention given Miss Smith, suggests that they would like to get acquainted by having the prospect call at the station whenever he needed any of the various services the station provides or if any road service is needed just call Harrison 3333, a telephone number that was secured only after lengthy negotiations.

The prospect is also told that the station will have a man call for the car and deliver it whenever the owner requires it, if that would be more convenient. The call and delivery feature has gained a lot of women customers who can have their cars fueled, oiled, lubricated, washed and polished while they are preening for the afternoon bridge.

There is no charge for calling for and delivering a car for the various services but for road service on tires and batteries the charge is 75 cents. Three small trucks are used in the road service and delivery service for the tire department.

Some difficulty was experienced in getting suitable saleswomen. At first two former school teachers were tried but they did not get over their message satisfactorily. Then the Y. W. C. A. was solicited for help and after that employment agencies. None was satisfactory until two young women who had been selling advertising by telephone for an Indianapolis newspaper were hired.

When a car is driven into the Prather-Bowen station one man inquires about the gasoline and another about the oil and water. Oil is not checked without the permission of the driver. This done, the windshield and rear window are wiped and the second man continues to wipe dust off the car as long as it remains in the station.

In checking batteries both the hydrometer and the voltmeter are used, and the customer is told the condition of the battery.

A car is jacked up for washing and the chassis cleaned as well as the upper parts. No effort is made to compete with the speed laundries; prices range from $1.50 to $3.50 per car but a thorough job is done.

In the wheel and axle department Mr. Prather says he has the best wheel and axle mechanic in Indianapolis and has equipped him with the latest tools and testing instruments. In the tire and battery departments are the latest tools and repair machinery. The equipment of the lubrication and washing departments upholds the high standard Mr. Prather said he had set up for the station.

The plant represents an investment of approximately $100,000. This is divided $50,000 for the land, $40,000

(*Continued on Page* 116)

ADVERTISING PAGES REMOVED

Standard of Kentucky Touring Service Averages 200 Requests Daily

By E. L. Barringer
N. P. N. STAFF WRITER

LOUISVILLE

HIGHWAY information for trips to any part of the country is supplied free by the Standard Oil Co. of Kentucky through its Standard Oil Touring Service.

This service was organized in April, 1929, to supply motorists with accurate road information, and to encourage auto travel for the increased consumption of gasoline, motor oil, and grease. The Touring Service is beginning its second year of service, and has built the demand for information to about 200 requests daily.

Information is sought in winter as well as in summer, and the volume of requests is fairly constant. The position of the Standard Oil Co. of Kentucky—marketing in Kentucky, Mississippi, Alabama, Georgia and Florida—places it right in line of the country's north-south traffic in the eastern states.

During the winter months the northern tourists are treking south; in the summer the northerners are returning and those of the southern states are moving north. Much information is asked also for trips in the New England states, around the Great Lakes region, and from eastern cities to the middle west or through to California.

Results of giving this road information may be judged by the letters it receives. Hundreds of motorists have written the Touring Service, complimenting it on its accurate routings, and many letters add that the writer has used Standard Oil products on the trip. There is no method for keeping a check on the gasoline or oil purchased by these tourists.

Standard Oil Touring Service has its headquarters at the Standard of Kentucky's main offices, 426 W. Bloom St., Louisville. W. E. Smith, president of the company, has been interested in the service and been in close touch with its activities. W. A. Alexander Jr. is the office manager of the service, and has two assistants; these three spend all their time laying out routes and answering correspondence on touring.

The touring service is in touch constantly with road conditions all over the country through the various state highway departments. It is on the mailing lists for all bulletins and letters. Another source of road information are Chamber of Commerce

When the American Legion met in Louisville in 1929 the Standard Oil Touring Service, conducted by the Standard Oil Co. of Kentucky, opened an information bureau downtown opposite the postoffice. Here is a group of Legionnaires getting the "low down" on the best route home

bureaus and special correspondents. This source keeps the service in touch with special conditions, such as river points where the highway may be flooded for a few days during high water, and the like. The marketing organization of the Standard of Kentucky has not been used to gather road information.

To obtain first hand road information around Louisville the touring service has a car traveling the highways. The car has traced highways out of Louisville for 1500 miles, but spends most of the time within a radius of 200 to 300 miles.

Maps are used mainly in laying out routes, and are passed out at service stations. For its own territory Standard of Kentucky issues maps by states; these maps cover the respective state intensely and include main highways for several hundred miles in all directions. Service stations have a supply of maps for the state in which it is located and a few for neighboring states. For other sections of the country maps issued by other companies of the Standard Oil group are used.

Several changes have been made by Standard of Kentucky in its 1930 edition of maps. Slight jogs in the road, down in the tenths of a mile, are shown now. Mileage between main cities and towns is indicated, and distances between main cities in the southeastern states are tabulated on the back cover.

To advertise the touring service to the public space has been used in newspapers, and cards are passed out at company service stations. Every Standard of Kentucky newspaper advertisement carries a coupon for touring information on which the reader may write his name, address, and ask a routing from one point to another.

Self-addressed post cards, not stamped, are placed in service stations for the convenience of the customer in writing for information. The printed form is to be filled in with name, address, and route desired. Different colors are used for the states so the returned cards may be tabulated. This type of card was selected as it required the least amount of effort on the part of the customer. Cards to be placed in envelopes were used last year, but this system required the customer hunting an envelope and addressing it.

All requests are answered on the day received. Mr. Alexander and an assistant mark routings and a stenographer handles the mailing which leaves the office three times each day.

Where possible routes are laid out on maps in colored crayon, with historic or scenic points indicated, and a form letter enclosed. The touring service has found it difficult to get the idea across that road legends should be studied, so the form letter bears heavily on this point.

Special requests, such as several optional routings, or requests for peculiar information, are answered with a personal letter.

In addition to highway information the service sends out details on boat and ferry schedules with tariff rates that the customer may need. But the service does not recommend any hotels, camps or restaurants.

Some requests required the touring service to get behind the request and determine what is wanted. For instance, this spring a routing around the Great Lakes was requested. Roads are favorable around Lakes Erie and Ontario but it would be a difficult trip to get around Lake Superior. In this case conditions were explained about a complete trip, and optional routes suggested so he could cover the territory having good roads. Many requests are received for routes between two big cities, one for going, the other for the return.

Then there is the freak request. One man wanted a routing to Lima, Peru; another to Europe. In these cases road information to the most convenient port is supplied. Another request this spring was for a trip touching every state capital. This was a fairly easy task in itself, but the bureau laid it out so the driver would reach the various states at the most favorable time of the year.

Directs Oil Ad at Women In Women's Magazines

CLEVELAND, May 14.—One out of every four. That is the percentage of women automobile drivers in this country today.

That fact has led The Texas Co. to carry advertising for the first time in women's magazines with national circulation, with the advertisements directed solely at women drivers.

This message is brought home to Texaco dealers in the May number of "The Texaco Mission," dealer publication of the company.

The first advertisement can hardly escape attention of women readers with its large type caption. "Women Drivers Are Safe Drivers." The truth of that caption is further substantiated with a footnote which says that statistics indicate 24 per cent of licensed drivers in the United States are women, yet they are involved in only 6 per cent of all automobile accidents.

That thought of safety which compels women to be thoughtful of the safety of others, is tied up in the advertisement with the safety that comes from using Texaco products.

Issues Motorboat Lube Chart

CLEVELAND—Cities Service Oil Co. has issued a chart of recommended grades of lubricants for motorboat engines and for outboard motors. The chart lists 45 makes of motorboat engines and nine of outboard motors. Recommendations are for Cities Service and for Koolmotor brands of motor oil.

Super-Service Means Super-Personnel

(*Continued from Page* 112)

for the building and $10,000 for the equipment.

The lot fronts 110 feet on the west side of Meridian street and 160 feet on the south side of 24th. The station is an L shaped building with gasoline pumps and radiator hydrants on a canopied island that parallels the Meridian street front.

In the court in front of the station building is plenty of room for cars. There is also room for 14 cars in the service stalls departments of the station building, which is steam-heated throughout.

In designing the building Mr. Prather incorporated the best ideas he had found or developed in years of tire selling on a national basis. He has grouped complementary services together. The three greasing pits are in a room beside the washing and polishing room: the best practice being to wash a car and then lubricate it.

There is a stall for several cars between the tire and battery repair shops. The wheel and axle, and brake departments are grouped together.

At the Meridian street end of the building is a sales and waiting room. Back of this is the office and under an ornamental tower is the room for the pump men and oil storage.

Part of the station has a basement for tire storage and the steam heating plant, which burns waste crankcase oil. The basement is remote from gasoline storage and the pump island.

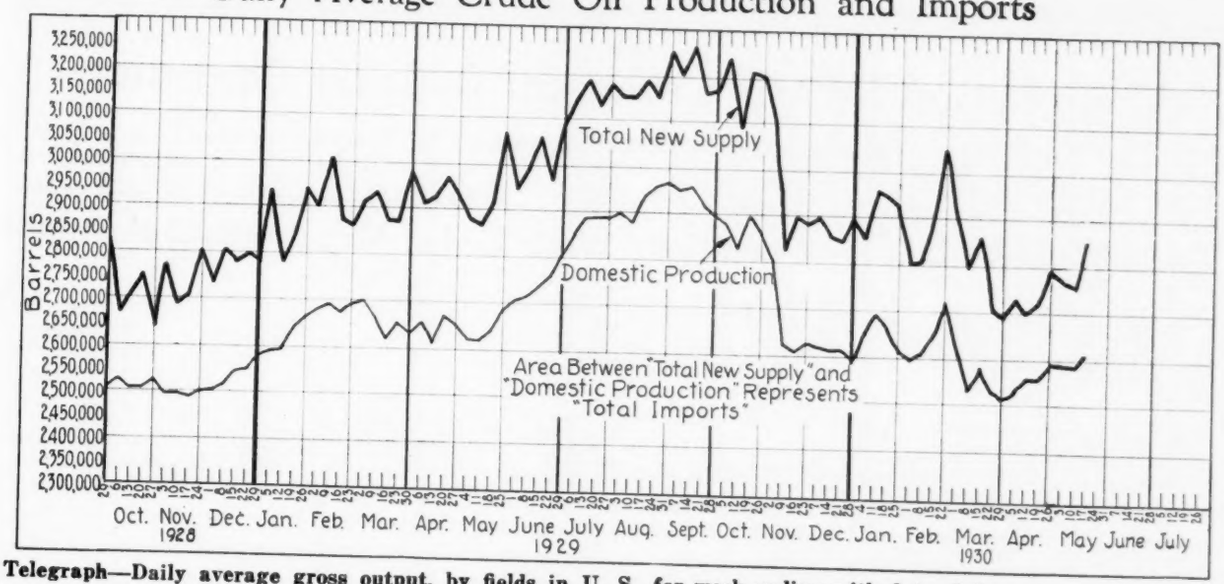
Air meters are near the tire department and along the 24th street side where cars will not impede entrance to and egress from the station, which has four 36-foot entrance drives, two from each street. Ease of entrance is one of the important things in station designing. Mr. Prather pointed out, especially where a large part of the trade comes from women drivers.

A guarantee to eliminate shimmy from a car or to refund the price charged originally in an effort to eliminate it, is featured. This is the work of the wheel and axle mechanic who has been successful with obstinate cases, Mr. Prather said.

The station sells Seiberling tires, Seiberling and Prest-O-Lite batteries, and Standard Oil Co. of Indiana petroleum products. It buys its gasoline under the Q. D. A. for tank wagon deliveries.

ADVERTISING PAGES REMOVED

Daily Average Crude Oil Production and Imports



By Telegraph—Daily average gross output, by fields in U. S., for week ending with dates below as compiled by A.P.I.

PRODUCTION SUMMARY

	May 17	May 10
Production east of Rockies	1,975,800	1,960,350
Increase		15,450
Total production in U. S.	2,607,900	2,595,150
Increase		12,750
Crude oil imports	259,860	166,715
Increase		93,145
Total new crude supply	2,867,760	2,761,865
Increase		105,895

OKLAHOMA

	May 17	May 10
Allen Dome	16,450	18,950
Asher	2,100	1,950
Blackwell	3,700	3,700
Bowlegs	13,300	14,400
Braman	3,450	3,500
Bristow-Slick	16,000	16,050
Burbank	16,350	16,500
Carr City	11,100	9,900
Cromwell	7,600	7,600
Cushing	13,900	13,900
Davenport	1,200	1,150
Duncan District	7,700	7,700
Earlsboro	44,950	40,750
East Earlsboro	34,550	36,250
Fox	1,250	1,250
Garber	4,750	4,750
Graham	3,500	3,500
Healdton	11,900	11,900
Hewitt	7,000	7,000
Hubbard	1,600	1,600
Konawa	15,800	15,700
Little River	28,900	32,100
Little River, East	15,500	15,500
Logan County	6,000	5,700
Maud	6,450	5,900
Mission	15,950	13,050
North Okmulgee	10,450	10,450
Oklahoma City	114,800	113,250
Osage (Outside Burbank)	26,100	26,100
Papoose	2,850	2,850
Pearson	900	800
Sasakwa	9,850	10,800
St. Louis	45,000	43,700
Scholem-Alechem	13,600	13,650
Searight	12,300	8,950
Seminole	16,500	15,450
Seminole, East	2,950	3,700
South Okmulgee	6,250	6,250
Thomas	650	650
Tonkawa	7,800	7,800
Wewoka	3,700	3,700
Yale-Jennings	8,600	8,600
Others	66,900	66,400
Total, Oklahoma	660,150	653,350
Increase		6,800

KANSAS

Augusta-Fox Bush	2,950	2,950
Churchill	4,200	4,000
Eldorado - Towanda	14,350	14,300
Florence-Covert	800	800
Greenwood County	19,000	19,000
Oxford	2,900	2,850
Peabody-Elbing	3,100	3,100
Rainbow Bend	1,050	1,100
Russell	3,500	3,550
Sedgwick County	19,900	21,200
Voshell	22,150	17,850
Others	37,500	36,450
Total, Kansas	131,400	127,150
Increase		4,250

NORTH LOUISIANA

Caddo, light	9,650	9,850
Caddo, heavy	2,900	2,900
Cotton Valley	2,200	2,150
De Soto and Red River	3,100	3,100
Haynesville	4,600	4,500
Holly	750	850
Homer	3,600	3,550
Sarepta Carterville	3,300	3,600
Urania	5,400	5,400
Zwolle	3,800	3,550
Others	1,700	1,700
Total, North Louisiana	41,000	41,150
Decrease		150

ARKANSAS

Champagnolle	3,900	4,100
El Dorado	4,050	4,100
Lisbon	1,000	1,000
Nevada	950	950
Smackover, light	5,300	5,300
Smackover, heavy	40,250	40,250
Stephens	950	950
Others	1,200	1,200
Total, Arkansas	57,600	57,850
Decrease		250

TEXAS (OUTSIDE GULF COAST)

Panhandle District

	May 17	May 10
Carson County	8,650	9,000
Gray County	70,850	68,250
Hutchinson County	22,900	24,300
Wheeler County	600	900
Others	500	400
Total, Panhandle Texas	103,500	102,850
Increase		650

North Texas

Archer County	19,000	18,550
Burkburnett	8,300	8,300
Electra	11,200	11,100
Iowa Park and K. M. A.	5,800	5,700
Montague-Cooke	10,400	10,500
Wilbarger	24,200	24,050
Others	2,000	1,900
Total, North Texas	80,900	80,100
Increase		800

West Central Texas

Brown County	7,500	7,600
Callahan County	4,000	4,000
Coleman County	4,100	4,200
Eastland-Desdemona	5,500	5,500
Jack County	3,850	4,100
Palo Pinto County	600	650
Shackleford County	6,550	6,650
Stephens County	6,050	6,150
Throckmorton County	1,000	1,150
Young County	19,200	18,800
Others	1,000	1,150
Total, West Central Texas	59,350	59,950
Decrease		600

West Texas

	May 17	May 10
Crane and Upton Counties	43,200	44,300
Crockett County	2,050	2,000
Ector County	13,400	14,100
Howard County	36,100	38,000
Jones County	1,300	1,400
Mitchell and Scurry Counties	2,350	2,250
Reagan County	16,400	16,400
Winkler County	75,200	77,800
Yates	113,800	113,500
Balance Pecos County	4,000	4,800
Others	2,750	2,800
Total, West Texas	310,550	317,350
Decrease		6,800

East Central Texas

	May 17	May 10
Boggy Creek	3,500	3,600
Corsicana-Powell	6,000	6,100
Currie	300	300
Mexia	4,200	4,300
Nigger Creek	200	200
Richland	250	250
Van Zandt	24,700	23,500
Wortham	900	900
Total, East Central Texas	40,050	39,150
Increase		900

Southwest Texas

Dale	300	300
Darst Creek	22,000	19,750
Laredo District	8,100	8,200
Luling	9,400	9,500
Lytton Springs	800	850
Salt Flat	21,900	22,300
Somerset	1,200	1,200
Others	1,700	1,750
Total, Southwest Texas	65,400	63,850
Increase		1,550
Total, Texas (Outside Gulf Coast)	659,750	663,250
Decrease		3,500

GULF COAST

Coastal Texas

Barbers Hill	18,050	18,200
Batson	1,100	1,100
Big Creek	4,250	4,300
Blue Ridge	1,900	2,100
Boling	1,100	1,050
Damon Mound	600	600
Esperson	3,000	3,450
Fannett	1,050	1,350
Goose Creek	4,300	4,500
Hull	10,650	10,100
Humble	18,000	18,800
North Dayton	500	550
Orange County	2,350	2,350
Pierce Junction	9,650	9,350
Port Neches	1,700	1,600
Raccoon Bend	12,050	12,000
Refugio County	39,600	38,850
Saratoga	1,050	1,100
Somerville	1,600	1,600
Sour Lake	2,350	2,350
South Liberty	4,300	4,600
Spindletop	15,900	16,200
Sugarland	12,200	11,850
West Columbia	5,550	5,600
Others	9,800	9,500
Total, Coastal Texas	182,600	183,050
Decrease		450

Coastal Louisiana

East Hackberry	2,100	2,200
Old Hackberry	1,400	1,300
Edgerly	550	550
Evangeline	800	800
Lake Barre	800	900
Lockport	2,800	2,750
Port Barre	2,300	2,000
Sulphur Dome	5,700	5,900
Vinton	3,700	3,700
Others	1,750	2,000
Total, Coastal Louisiana	21,900	22,100
Decrease		200
Total, Gulf Coast	204,500	205,150
Decrease		650

ROCKY MOUNTAIN

Wyoming

Big Muddy	2,100	2,050
Elk Basin	850	750
Grass Creek	2,100	2,100
Labarge	1,850	1,850
Lance Creek	150	150
Lost Soldier	2,800	2,950
Oregon Basin	4,700	4,700
Rock River	2,150	2,200
Salt Creek	30,950	26,100
Others	5,300	5,150
Total, Wyoming	52,950	48,000
Increase		4,950

Montana

Cat Creek	1,300	1,200
Pondera	2,300	2,350
Sunburst	5,600	5,600
Others	100	50
Total, Montana	9,300	9,200
Increase		100

COLORADO

Florence	550	550
Fort Collins	1,450	1,500
Moffat (Craig)	850	1,000
Others	1,450	1,550
Total, Colorado	4,300	4,600
Decrease		300

New Mexico

Artesia	750	700
Balance Lea and Eddy Counties	15,250	9,900
Hogback	450	450
Rattlesnake	450	400
Table Mesa	100	100
Others	900	900
Total, New Mexico	17,900	12,450
Increase		5,450
Total, Rocky Mountain	84,450	74,250
Increase		10,200

CALIFORNIA

Dominguez	10,400	10,000
Elwood-Goleta	44,900	45,300
Huntington Beach	28,300	28,300
Inglewood	17,200	17,400
Kettleman Hills	15,700	15,000
Long Beach	99,500	99,800
Midway-Sunset	67,000	68,000
Santa Fe Springs	129,000	134,500
Seal Beach	23,900	23,500
Ventura Avenue	51,200	49,000
Others	145,000	144,000
Total, California	632,100	634,800
Decrease		2,700

EASTERN

(Not including Michigan)	126,000	127,000
Decrease		1,000

MICHIGAN

Mt. Pleasant	6,500	6,750
Muskegon	4,250	4,300
Saginaw	200	150
Total, Michigan	10,950	11,200
Decrease		250

Compilation Of Mid-Continent Refinery Operations

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Mid-Continent Refinery Operations Week Ended May 16 (By Telegraph)

	Kansas	Oklahoma	North & Cent. Texas	West Texas	North La.-Ark.	Total Week Ended May 16
Plants Reporting	12	29	25	15	12	93
Da. Av. Cap. (Bbls.)	94,500	161,700	106,100	82,000	77,000	521,300
Da. Cracking Capacity	30,700	52,600	17,200	5,000	22,700	128,300
Da. Av. Crude Runs	67,763 + 5.3	121,845 + 4.4	73,024 — 0.1	47,561 + 5.2	55,825 + 4.5	366,018 + 3.7
Da. Av. Other Oils	7,049 — 9.7	8,854 +108.5	1,649 + 4.2	2,239 — 49.0	1,225 +187.6	21,016 + 13.9
GASOLINE—Gallons						
Stocks, May 9	27,581,000	72,899,000	25,811,000	10,838,000	15,482,000	152,611,000
Prod. 5-9 to 5-16	11,740,000 + 4.3	19,641,000 + 3.7	9,827,000 — 1.1	5,146,000 + 10.2	5,415,000 + 2.8	51,769,000 + 3.4
Ship. 5-9 to 5-16	9,559,000 — 14.5	16,275,000 — 4.5	9,994,000 + 21.6	5,151,000 + 69.7	5,593,000 + 43.0	46,572,000 + 7.3
Stocks, May 16	29,762,000 + 7.9	76,265,000 + 4.6	25,644,000 — 0.6	10,833,000 — 0.1	15,304,000 — 1.2	157,808,000 + 3.4
Ratio Sales to Prod.	81.4%	82.9%	101.7%	100.1%	103.3%	90.0%
KEROSENE—Gallons						
Stocks, May 9	8,473,000	7,815,000	3,513,000	25,000	1,742,000	21,568,000
Prod. 5-9 to 5-16	2,267,000 + 9.8	3,219,000 + 10.6	1,574,000 — 11.9	22,000	319,000 — 34.8	7,401,000 + 2.1
Ship. 5-9 to 5-16	1,825,000 + 3.7	2,225,000 — 12.3	1,576,000 + 20.1	11,000	496,000 — 18.6	6,133,000 — 1.2
Stocks, May 16	8,915,000 + 5.2	8,809,000 + 12.7	3,511,000 — 0.1	36,000 + 44.0	1,565,000 — 10.2	22,836,000 + 5.9
Ratio Sales to Prod.	80.5%	69.1%	100.1%	50.0%	155.5%	82.9%
STOVE DISTILLATE—Gallons						
Stocks, May 9	3,284,000	2,706,000	292,000	205,000	475,000	6,962,000
Prod. 5-9 to 5-16	404,000 + 60.9	660,000 + 42.5	127,000 — 15.9	210,000 + 82.6	203,000 +1461.5	1,604,000 + 61.5
Ship. 5-9 to 5-16	42,000 — 69.6	542,000 + 48.1	124,000 + 2.4	165,000 + 30.9	3,000 — 96.6	876,000 + 4.5
Stocks, May 16	3,646,000 + 11.0	2,824,000 + 4.4	295,000 + 1.0	250,000 + 22.0	675,000 + 42.1	7,690,000 + 10.5
Ratio Sales to Prod.	10.4%	82.1%	97.6%	78.6%	1.5%	54.6%
GAS OIL—Gallons						
Stocks, May 9	8,410,000	42,905,000	2,379,000	4,748,000	8,773,000	67,215,000
Prod. 5-9 to 5-16	3,526,000	1,548,000 — 31.1	884,000 + 17.6	371,000 — 39.4	2,332,000 + 15.3	1,609,000 — 78.4
Ship. 5-9 to 5-16	10,000 — 99.3	1,625,000 — 44.7	607,000 — 27.5	479,000	2,284,000 + 1.8	5,005,000 — 30.5
Stocks, May 16	4,874,000 — 42.0	42,828,000 — 0.2	2,656,000 + 11.6	4,640,000 — 2.3	8,821,000 + 0.5	63,819,000 — 5.1
Ratio Sales to Prod.	.....	105.0%	68.7%	129.1%	97.9%	311.1%
FUEL OIL—Gallons						
Stocks, May 9	18,371,000	38,354,000	68,160,000	14,559,000	24,719,000	164,163,000
Prod. 5-9 to 5-16	9,904,000 + 85.9	8,157,000 + 20.4	8,461,000 — 2.9	7,565,000 + 12.9	4,993,000 + 2.2	39,080,000 +20.6
Ship. 5-9 to 5-16	4,657,000 + 2.7	6,923,000 + 9.1	7,450,000 — 18.2	5,443,000 — 5.2	4,267,000 — 34.7	28,740,000 —10.9
Stocks, May 16	23,618,000 + 28.6	39,588,000 + 3.2	69,171,000 + 1.5	16,681,000 + 14.6	25,445,000 + 2.9	174,503,000 + 6.3
Ratio Sales to Prod.	47.0%	84.9%	88.1%	71.9%	85.5%	73.5%

Gasoline Produced by Various Methods, Week Ended May 16

	Kansas	% of Total	Oklahoma	% of Total	North & Cent. Texas	% of Total	West Texas	% of Total	Louisiana-Arkansas	% of Total	Total	% of Total
Straight Run	7,055,000	60.1	13,335,000	67.9	7,516,000	76.5	4,497,000	87.4	1,990,000	36.7	34,393,000	66.4
Cracked	4,057,000	34.6	5,264,000	26.8	1,630,000	16.6	430,000	8.4	2,477,000	45.7	13,858,000	26.8
Natural	628,000	5.3	1,042,000	5.3	681,000	6.9	219,000	4.2	948,000	17.6	3,518,000	6.8
Total	11,740,000		19,641,000		9,827,000		5,146,000		5,415,000		51,769,000	

+ or — columns are % change over previous week.

Gasoline Stocks Rise to Near Year's Peak

Staff Special—By Telegraph
TULSA, May 20

MID-CONTINENT refiners that report statistics of their operations weekly to NATIONAL PETROLEUM NEWS, increased gasoline stocks 5,100,000 gallons in the week ended May 16. Increase was in Oklahoma and Kansas. Other districts held stocks level or drew on them slightly.

Crude oil runs were increased 13,200 barrels daily average. North Texas was the only district to hold down runs.

Gasoline production increased 1,700,000 gallons. Shipments increased 3,100,000 gallons over shipments the preceding week. Stocks increased to 157,808,000 gallons, less than 1,000,000 gallons under the peak of March 7.

Kerosene stocks increased 1,200,000 gallons. North Texas and Louisiana-Arkansas districts were only one to

Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended May 16. Change in stocks figures from April 18.

GASOLINE

	Gallons
Production	203,308,000
Shipments	181,473,000
Net change in stocks	+21,835,000
Ratio sales to production	89.3%

KEROSENE

	Gallons
Production	29,442,000
Shipments	24,892,000
Net change in stocks	+4,550,000
Ratio sales to production	84.5%

STOVE DISTILLATE

	Gallons
Production	4,980,000
Shipments	3,304,000
Net change in stocks	+1,676,000
Ratio sales to production	66.3%

GAS OIL

	Gallons
Production	25,438,000
Shipments	28,350,000
Net change in stocks	—2,912,000
Ratio sales to production	111.4%

FUEL OIL

	Gallons
Production	135,569,000
Shipments	117,549,000
Net change in stocks	+18,020,000
Ratio sales to production	86.7%

lower stocks.

Distillate stocks increased 720,000 gallons.

Transfer by one company of a large volume of gas oil to fuel oil stocks shows as a 4,100,000-gallon reduction in gas oil stocks.

Fuel oil production was increased. Shipments were slightly lower. Stocks increased 10,300,000 gallons.

Oil Broadcasts of Sir John Cadman Published

CLEVELAND, May 16.—The six lectures on oil which were broadcast in London during March by Sir John Cadman, chairman of the board of the Anglo-Persian Oil Co., Ltd., London, have been reprinted in booklet form by the British Broadcasting Corp. under the title of "The Romance of Oil."

Something of the early discoveries of petroleum, its development and geographical distribution, of refining processes and economics of the industry today are told in an interesting manner understandable to the masses that make up a radio public.

Sir John endeavors to drive home to the listener the magnitude of the industry, both from point of view of its growth and its use to civilization, saying, in part:

"Petrol, kerosene and lubricating oils . . . have become commonplaces in our existence; nevertheless, behind them there is a welter of complicated and colossal operations, each of which has to be performed with routine smoothness and efficiency. Next time you start up your car or light your paraffin stove, you may think of the great range of endeavor that is an essential preliminary to that simple process.

"In a single day the United States makes enough motor-spirit to supply London for three months, or the whole of the British Isles for a fortnight."

Colorado Jobbers Take On Dixie

ANN ARBOR, Mich., May 17.—A group of oil jobbers in Colorado is the latest addition to Dixie Distributors, Inc. Brayton Armstrong, of the Sentry Oil Co., Denver, is president of the Colorado group, and R. W. McNeal, McNeal Oil Co., La Junta, Col., is secretary-treasurer, according to R. F. Diekhoff, secretary of Dixie Interstate at Ann Arbor.

Through the service stations operated by the members of Dixie Distributors in Colorado, Dixie oil and gasoline are now sold in the entire central and southeastern part of the state.

Newspaper advertising will be undertaken by the organization, Mr. Diekhoff says, as well as uniform outdoor advertising over the Dixie territory.

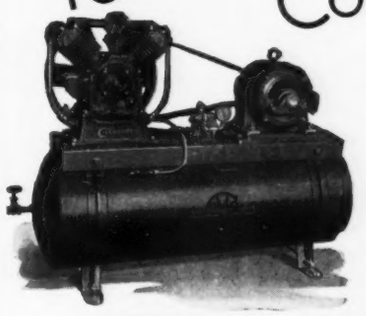
BLUE DIAMOND ANTI-KNOCK GASOLINE
(40 to 50% Benzol Equivalent)
Available at New York Harbor

BLUE DIAMOND
Kerosene

Special Naphthas & Rubber Solvents
100% Pennsylvania Motor Oils
and Refined Products

Mid-Penn Refining Co.
Oil City, Pa.
PURE PENNSYLVANIA BLUE DIAMOND KEROSENE SUPER REFINED
P. O. Box 617

Powerful Compact Quiet



Designed for Continuous Operation

CHAMPION Single Stage, Four Cylinder—Ball-Bearing "V" Type, Air Cooled Compressors SE-28 and SE-39.

Displacement 28 to 36½ cubic feet of air per minute. Due to CHAMPION cylinder and piston design, these compressors may be operated continuously without danger of overheating or loss of efficiency. No water connections or piping necessary and no danger of cylinders, etc., freezing in cold weather. Complete, ready to run when connected to electric current.

CHAMPION

Write today for CHAMPION catalog describing and illustrating special values in modern developments of air compressors, service towers, car-washers and other dependable service station equipment.
The use of CHAMPION equipment pays big dividends.

Champion Pneumatic Machinery Co.
8168 South Chicago Ave., Chicago, Ill. *Cable: McKin-Boston*

Champion Pneumatic Machinery Co.,
8168 South Chicago Ave., Chicago, Ill.
Please send me complete information regarding [ ] CHAMPION Air Compressors [ ] Service Towers [ ] Ceiling Reels [ ] Car Washers [ ] Paint Spray Equipment.
Name .....
Address .....
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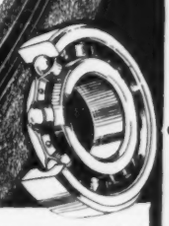


Annular Ball Bearings Used as Main Bearings Because:
They never need adjustment
Insure quiet operation
Reduce vibration
Require less lubrication
Require less power to operate

Marketing methods have changed, too! *Sell*

SINCLAIR THREE-GAS SERVICE

There are today so many different types of engines —and so many different driving conditions in traffic and in the open—that one kind of gasoline today cannot be *exactly right* for *all* cars, and for *all* needs. It takes *three* different gasolines to meet all motoring demands, and wise motorists will buy their gas where they can *choose* from these three and get superior engine performance—give your trade these three and build increased gallonage.

Here's *Sinclair Aircraft Gasoline*, the *Ace* of high test gasolines, for the motorist who wants quick getaway, flashy acceleration and brilliant road performance. Sinclair Aircraft is the Ace of high test gasolines because it is specially manufactured at Sinclair Refineries, meeting the requirements of the Federal Specifications Board for Aviation Gasoline—domestic grade—and gives sustained power. Due to its careful fractionation it is free from dissolved gases which cause gas locks, uneven distribution, galloping and engine balk.

Here's *Sinclair H-C Gasoline* for those who want high compression performance—*who want to stop knocks and keep them stopped*—all gasoline, nothing added!

And here's *Sinclair Regular Gasoline* for those who prefer to pay three cents less per gallon and yet get gas that is full of eager power. The quality gasoline at a popular price! Sell Sinclair Three-Gas Service—get the jump on competition and earn a jump in gallonage.

SINCLAIR REFINING COMPANY, INC., 45 Nassau Street, New York—*Atlanta, Chicago, Houston, Kansas City*

Refinery - Tank Wagon Markets

National Petroleum News

Gasoline Prices Lose More Ground As Buying Lull Continues

CLEVELAND, May 20

JOBBING demand for refined oils continued extremely light in nearly every refining district in the country in the week ended May 17. The downward movement of gasoline prices which has been under way since the first of the month extended further except along the eastern seaboard.

In the east the 25-cent reduction in Pennsylvania crude was the outstanding event of the week. It was the second reduction in this amount within a period of two weeks and took the entire eastern trade by surprise. The Santa Fe Springs crude cut came too late in the week to have any apparent effect on western markets.

Trading in the Pennsylvania market has been on a relatively small scale prior to the cut in crude prices. The reduction brought almost a complete cessation of buying by jobbers, according to reports from most traders in this area.

The effect of the Pennsylvania crude cut on markets in other refining districts was more psychological than anything else. In the middle west it served further to depress gasoline markets which already were pretty much in the doldrums. In some sections it even stilled the talk of another advance in Mid-Continent crude.

Export buying, deferred shipment buying by jobbers and even a steady spot demand from the jobbing trade—all were lacking in the Mid-Continent. And with weather conditions none too favorable, gasoline markets in this area were confronted with a pretty tough proposition.

Distress gasoline from the smaller refiners in the Mid-Continent appeared in rather large volume. This showed up very quickly in the Chicago market. U. S. Motor was offered there at 0.25 cent under the minimum price of the previous week.

Gasoline prices in practically all districts along the east coast advanced 0.25 to 0.5 cent. Prices in this territory had been slow to reflect the earlier improvement in other sections of the country. With weather conditions slightly more favorable there, the advance in prices was more or less expected by the trade.

Inclement weather generally was said to have caused the further recessions noted in kerosene prices in all territories. Fuel oil prices also sought lower levels.

Lubricating oils were inactive but prices for the most part were unchanged. Both foreign and domestic demand for wax continued relatively light. Prices for white crude scale were down 0.05 to 0.10 cent a pound.

U. S. Motor Down 0.25 Cent in Chicago

Staff Special

CHICAGO, May 17

MOST of the middle western jobbing trade continued to show a lack of interest in spot gasolines. As a result the Chicago market was anything but active during the week ended May 17. Practically all sellers reported an exceedingly dull spot market, although a steady movement of contract gasolines was reported in most quarters.

In the face of adverse weather conditions and the general lack of spot buying, the reduction in Pennsylvania crude oil on May 16 did not improve the general situation any. While it was generally reported that the reduction would have little or no direct effect on the Chicago market, it helped to still all talk of a Mid-Continent crude or a Standard of Indiana tank wagon advance and lent a further bearish tone to the local market.

Spot gasoline prices continued to move lower. The general run of sales reported were at least 0.125-cent lower than at the end of the previous week. On May 17, carlot marketers generally offered U. S. Motor for prompt shipment at 6.875 to 7 cents. Two or three said they were willing to sell at 6.75 cents, if shipping instructions were furnished with the order.

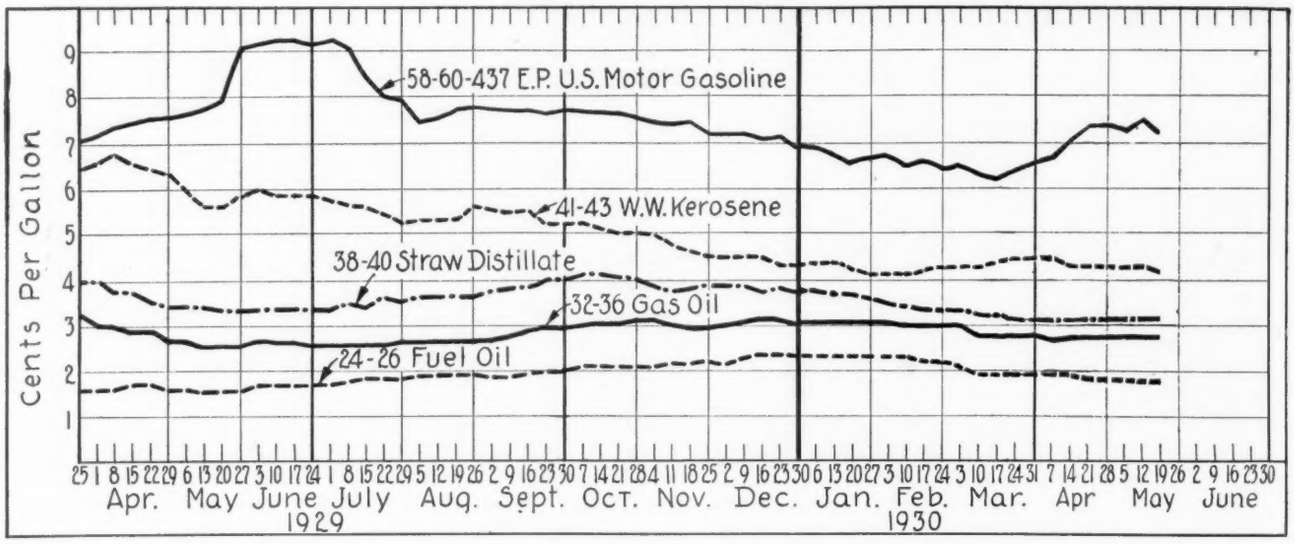
Chicago district refiners and Oklahoma and north Texas refiners who have sales offices in Chicago, reported quotations on U. S. Motor gasoline ranging from 6.875 to 7.50 cents. Most of them said they were not doing much business in the spot market. The bulk of sales reported were at 6.875 to 7.125 cents.

Some difference of opinion was reported as to buying prices for U. S. Motor for resale purposes, by the various Chicago marketers. The majority of them said they were unable to buy full specification U. S. Motor gasoline, either in Oklahoma or north Texas, at under 6.625 cents. A few others said they believed they could buy in north Texas at 6.50 cents, Group 3 basis, if they gave shipping instructions with the order. It was reported that Tulsa marketers were offering U. S. Motor gasoline at 6.50 cents, plus a buying charge of $5 per car.

Marketers generally reported that it was hard to determine the real resale buying level. They said that refiners were not making them many offers, since business in the spot market had been so light that it was almost a waste of time making quotations. Two or three sellers said they had been receiving more inquiries from jobbers lately, but that they evidently were only feeling out the market. Little actual business had been transacted.

Demand for kerosene was light in most quarters, although a few sellers reported a steady movement. One marketer said his kerosene business was considerably better than his gaso-

Current Prices of Principal Mid-Continent Refined Products


58-60-437 E.P. U.S. Motor Gasoline
41-43 W.W. Kerosene
38-40 Straw Distillate
32-36 Gas Oil
24-26 Fuel Oil
Cents Per Gallon
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr May June
1929
1930

Prices shown are in Group 3 basis and extended to date shown in Refinery Market Tables Section of this issue

line business. Sales of 41-43 w.w. kerosene generally were reported at 4.125 to 4.25 cents. Two or three marketers said they could buy for resale at under 4 cents, but the majority said that this price was the bottom for full specification goods.

The cool weather prevailing in the Chicago district helped the consumption of furnace oils, but demand was not heavy enough to do more than keep prices fairly stable. An occasional sale of 38-40 straw distillate was reported at 2.875 cents, but most distributors reported they were paying 3 or 3.125 cents for good oil.

Not much change was reported in the industrial fuel situation. Most sellers reported their customers were doing little buying at present. Several grades of fuel oils, notably 18-22, moved at lower prices. Sales of 32-36 ordinary dark gas oil were reported at 2.25 cents in several quarters.

Rather frequent precipitation is likely next week over most of the Standard of Indiana territory, says the Chicago weather bureau. Temperatures probably below normal first half, becoming warmer in later days.

Sun Oil Gets U. S. Loan To Build Five Tankers

WASHINGTON, May 19.—Plans of the Sun Oil Co. for the construction of five tankers under the terms of the White shipbuilding act have been made feasible by the Shipping Board. That body has approved a loan for an amount not exceeding $6,328,125 to the Motor Tankship Corp. a Sun affiliate. Contracts between the tankship corporation and the Sun Shipbuilding & Drydock Co., with yards at Chester, Pa. had been agreed upon so that as soon as the Shipping Board approved the loan under the act of Congress intended to aid in the construction of an American merchant marine under the American flag everything was ready to go.

The tankers will be of approximately 13,500 tons deadweight, Diesel engined and capable of 11 knots speed. They will be owned by the tankship corporation which will charter them to the refining company for bringing crude from whatever field the refining company desires to draw upon for production. The loan is equal to three-fourths of the cost of building the tankers.

Shipments From Southern California

LOS ANGELES, May 15.—Shipments of bulk petroleum from Southern California ports for week ended May 10 were reported as follows:

Destination	Crude	Gasoline	Diesel	Kerosene	Fuel	Gas-Oil	Total
Pacific For.	38,383	125,875	3,997	10,251	81,103	.....	259,609
Atlantic Dom.	.....	202,309	.....	.....	.....	.....	202,309
Atlantic For.	.....	305,388	.....	.....	.....	.....	305,388

Shipments during the month of April increased 572,134 barrels to give a total of 10,210,887 barrels distributed as follows:

	Crude	Gasoline	Kerosene	Distillate	Diesel	Fuel	Total
Pacific Dom.	1,041,975	842,358	14,541	20,202	113,220	1,818,241	3,850,537
Pacific For.	294,410	316,505	535,653	14,355	375,567	1,901,577	3,438,067
Atlantic Dom.	6,959	1,583,388	193,596	.....	114,725	.....	1,898,668
Atlantic For.	.....	1,023,615	.....	.....	.....	.....	1,023,615
Total	1,343,344	3,765,866	743,790	34,557	603,512	3,719,818	10,210,887

Prices 10 Years Ago
May 17, 1920

	Oklahoma	Penna.
58-60 U. S. Motor	23.00–23.50c	25.50c
80-84 Natural	18.00–19.00c	.....
Kerosene (41-43 Okla.; 47 w. w. Pa.)	11.25–11.50c	16.00c
Fuel Oil (24-26 Okla.; 38-40 Pa.)	$3.40–$3.60	14.00c
Crude (Okla. 35-35.9)	$3.50	$6.10
Chicago tank wagon		25.00c

Prices A Year Ago
May 20, 1929

	Oklahoma	Penna.
58-60 U. S. Motor	7.9037c	9.25–9.75c
Grade A Natural	6.75	.....
Kerosene (Okla. 41-43; Pa., 47 w. w.)	5.50–5.75c	7.875–8.25c
Fuel Oil (Okla. 24-26; Pa. 36-40)	$0.625–$0.725	5.375–5.625c
Crude (Okla. 35-35.9)	$1.40	$4.00
Chicago tank wagon		15.00c

Mid-Continent Refinery Markets

All Commodities Remain Inactive

Staff Special
TULSA, May 17

THE Mid-Continent market was exceptionally quiet throughout the entire second week of May. No features were of outstanding interest. Gasolines lost ground in virtually all districts. Kerosenes were slow except in Kansas. Fuel oils remained sluggish with some price concessions noted in isolated instances. Natural gasolines lost some ground in sympathy with refined gasolines.

The weather continued to be the controlling factor in the gasoline market. A Kansas refiner about the middle of the week blanketed his trade with quotations by wire only to receive replies that the jobber's storage either was full or that he was not interested in the market just at present. Rains were reported general over much of the middle west.

Virtually the same reports were received by general offices in Tulsa from the division offices throughout the marketing territory. The adverse weather naturally kept consumption low. Jobbers by doing a little hand to mouth buying could keep fairly well out of the market.

The result in both Oklahoma and Kansas was the development of a widespread in quotations. A few of the smaller refiners in Oklahoma, particularly, needed to move some gasoline in the course of the week and made some attractive quotations to marketers provided immediate instructions were furnished. Marketers reported, however, that with only an occasional exception they were unable to take advantage of the prices put on the distress goods because they could not interest the buyers at any price.

With that situation existing a majority of the larger refiners were content to quote unchanged prices and not meet the competition reported to them. They felt that the condition of the market was such that price had no bearing on demand.

North and west Texas refiners made some price reductions in the course of the week. A few refiners in north Texas, who have little storage quoted their 58-60, 437 e.p. gasoline as low as 6.625 and 6.75 cents, group 3 basis, late in the week. Some of this gasoline was quoted for movement into Standard of Indiana territory, while a few of the quotations were for shipment within the state and into southeastern territory in competition with Louisiana and Arkansas.

One marketer operating in the Texas area said this week that he entered the month of May with over 300 cars of gasoline already sold for delivery over the month. He said he had been able to get shipping instructions on only about 25 per cent so far this month.

The Louisiana and Arkansas refiners were the only ones who made no changes in quotations during the week, for shipment into differential territory, but almost without exception they reported spot demand was exceedingly light, while contract movement was only fair.

The general opinion as the week ended, however, was that a week or 10 days of fair weather in the middle west would stimulate jobber buying to a large extent. Any concerted buying would give considerable firmness to the price structure, provided the distress gasoline was absorbed prior to the increase in buying.

At this season of the year only a few days of sunshine would make most of the now almost impassable dirt roads fit for travel, and result in an increase in consumption.

Natural gasolines reacted in sympathy with refined gasolines. The grade AA did not lose as much ground as the lower grades, however, due primarily to the fact that Phillips Petroleum Co. recently shipped a cargo of naturals for export and accordingly has been buying to fill its storage at the Gulf. The company on May 14 shipped a part cargo for export, which was taken as an indication it would still be in the market to buy.

Buying by refiners was somewhat lighter. A few of them had discontinued the use of naturals entirely, while manufacturers said some of their refinery accounts had held up shipping instructions.

Kerosenes remained comparatively active in Kansas. One refiner late in the week bought approximately 50 cars from other refiners to apply on his orders.

The Oklahoma refiners were not so fortunately situated. The kerosene demand was comparatively light and competition from other areas kept prices easy. The weather also had its effect on the demand, farmers being unable to get into their fields for late plowing.

North Texas refiners experienced about the same condition as did the Oklahoma refiners. Reports were received that some kerosene had been offered for export at under 4 cents a gallon, but no domestic business was reported at less than this price.

The north Louisiana and Arkansas refiners obtained sufficient business in their differential territory, coupled with a few export orders already on their books, to take care of their kerosene production.

Gas oils and distillates were virtually out of the market picture. Prices were steady, however, in most districts.

Fuel oils continued to be freely offered in all districts. Many refiners reported difficulty moving their production. Orders for both spot and over the month were comparatively small in volume, the trade reported. The opinion was general that this situation would exist for another two or three months at least.

Neutral oils continued to be in active demand, a majority of manufacturers reported, but prices were unchanged. Bright stock quotations were unchanged but as far as could be checked no sales were made to domestic jobbers for spot shipment during the week. Prices were nominal and represented entirely the refiners' quotations. Considerable competition was reported from other districts but Oklahoma refiners apparently were still willing to add to storage rather than meet the lower prices.

Gulf Coastal Water Shipments—April Compared with March

(All figures in Barrels of 42 Gallons)

Company—Port	Coastwise Refined March	Coastwise Refined April	Export Refined March	Export Refined April
Standard of Louisiana, Baton Rouge	1,308,049.00	429,415.00	475,918.00	593,229.00
The Texas Company, Port Arthur	985,558.00	1,242,741.00	447,564.00	342,917.00
Gulf Refining Co., Port Arthur	3,121,090.50	2,506,675.68	91,294.39	178,385.02
Magnolia Petroleum Co., Beaumont	1,488,088.21	1,419,702.21	(*)	
Humble Oil & Rfg. Co., Baytown	1,716,716.15	2,320,744.89	2,028,560.10	2,042,646.15
Atlantic O. Prod. Co., Atreco	254,481.37	68,089.21		
Pure Oil Company, Smiths Bluff	519,781.44	424,225.92		
TOTALS	9,393,764.67	8,411,593.91	3,043,336.49	3,157,177.17
	Coastwise Crude		Export Crude	
Standard of Louisiana, Baton Rouge	236,090.00	423,312.00		
The Texas Company, Port Arthur	152,339.00			
Gulf Refining Co., Port Arthur	495,942.76	445,030.84		
Magnolia Petroleum Co., Beaumont	1,195,791.31	958,581.32	(*)	
Humble Oil & Rfg. Co.,				
Texas City	475,359.00	615,307.00	54,336.00	
Ingleside	86,287.00	165,360.00		
Baytown	280,171.00	215,776.00		53,794.00
Harbor Island	2,339,305.00	1,521,814.00		
Neches	59,639.00			
Atlantic O. Prod. Co.,				
Atreco	735,814.77	839,324.37		
Beaumont	142,900.91	182,339.45		
Pure Oil Company, Smiths Bluff	591,935.17	700,194.37		
Sun Oil Company Sabine Pass	1,028,316.00	775,243.00		
TOTALS	7,819,890.92	6,842,282.35	54,336.00	53,794.00

(*) Magnolia Petroleum Company makes no distinction in reports between coastwise and export shipments.

Comparative Prices of 58-60 U. S. Motor Gasoline, 437 E. P., Group 3 and Point of Origin, to Jobbers Only

In Effect May 19

	Price F.O.B. Group 3		*Price F.O.B. Point of Origin*		*If for Particular Destination*
Oklahoma	7.1023	(Wt. Avg.)	7.1023	(Wt. Avg.)	.....
Kansas	7.00–7.25	.....	.....	.....	S. O. Neb. & Indiana Territory, etc.
Kansas	.....	.....	7.7500	(Wt. Avg.)	Kansas only.
North Texas	6.75–7.25	.....	6.75–7.25	.....	.....
West Texas	7.00–7.25	.....	7.00–7.25	.....	.....
Louisiana-Arkansas	7.25–7.50	.....	.....	.....	Michigan, Ohio and Indiana.
Louisiana-Arkansas	.....	.....	7.75	.....	State or differential haul.
Indiana-Illinois	7.125–7.50	.....	.....*	.....	S. O. Indiana territory except Detroit and vicinity. For Ohio on delivered basis only.

*Shipments made from E. Chicago, Ind., and Wood River, Ill., according to conditions and freight rates; no prices F.O.B. point of origin can be given.

Chicago Resale Market

CHICAGO, May 17

TWO or three Chicago marketers offered U. S. Motor gasoline for prompt shipment at 6.75 cents, but the majority of sellers reported their gasoline moving at 6.875 to 7.125 cents. Most marketers reported their buying prices were 6.625 to 6.75 cents on Oklahoma and north Texas U. S. Motor. Several said they believed they could buy at 6.50 cents, Group 3 basis, in north Texas if shipping instructions were furnished with the order. Quotations of refiners ranged from 6.875 to 7.50 cents, with only occasional sales reported above 7.125 cents.

Following prices represent majority of sales made on Group 3 freight basis, although shipments may originate in other refining districts such as north and west Texas, Arkansas, Louisiana, Indiana, Illinois, Kentucky, etc.

	Prices May 19	Prices May 12	Prices May 5
58-60 U. S. Motor, 437 e.p.	6.75 – 7.125	7.00 – 7.25	7.125– 7.375
60-62 437 e.p. gasoline	7.00 – 7.25	7.125– 7.375	7.25 – 7.50
60-62 400 e.p. gasoline	7.25 – 7.50	7.375– 7.75	7.50 – 7.75
64-66 375 e.p. gasoline	7.75 – 8.00	7.75 – 8.00	7.75 – 8.00
68-70 350-360 e.p. gasoline	8.00 – 8.25	8.00 – 8.25	8.00 – 8.25
*Domestic Aviation Gasoline	9.50 – 9.75	9.50 – 9.75	9.50 – 9.75
41-43 w.w. kerosene	4.00 – 4.25	4.125– 4.375	4.25 – 4.50
42-44 w.w. kerosene	4.50 – 4.75	4.50 – 4.75	4.625– 4.75
38-40 straw distillate	3.00 – 3.125	3.00 – 3.125	3.00 – 3.125
32-36 ordinary dark gas oil	2.25 – 2.50	2.375– 2.625	2.375– 2.625
32-36 dark zero gas oil	2.50 – 2.75	2.50 – 2.75	2.50 – 2.75
32-36 straw zero gas oil	2.625– 2.75	2.625– 2.75	2.625– 2.75
28-30 zero fuel oil (per bbl.)	$0.90 –$0.95	$0.90 –$0.95	$0.90 –$0.95
28-30 fuel oil (per bbl.)	$0.90 –$0.95	$0.90 –$0.95	$0.90 –$0.95
24-26 fuel oil (per bbl.)	$0.725–$0.775	$0.75 –$0.80	$0.75 –$0.80
18-22 fuel oil, low sulfur (per bbl.)	$0.55 –$0.60	$0.60 –$0.65	$0.60 –$0.65
18-22 fuel oil, high sulfur zero (per bbl.)	$0.575–$0.625	$0.60 –$0.65	$0.60 –$0.65

*Prices are based on U. S. Gov't. specifications or better. Present Gov't. specifications require distillation range of 5% recovery at not more than 167° F., and not less than 122° F.; 50% recovery at 221°.; 90% at 311°; 96% at 347°; end point 374° F. Gasoline of fighting grade specifications in some instances sells at a premium over domestic aviation grade. Prices represent majority of quotations.

Weighted Average Prices

OKLAHOMA

	May 19		May 12		May 5	
	No. of cars	Price	No. of cars	Price	No. of cars	Price
58-60 U. S. Motor, 437 e.p.	11	7.1023	6	7.2083	9	7.3611
60-62 437 e.p. gasoline	No sales reported		4	7.5000	No sales reported	
60-62 400 e.p. gasoline	No sales reported		No sales reported		1	7.7500
64-66 375 e.p. gasoline	No sales reported		No sales reported		No sales reported	
*58-60 437 e.p. gasoline	..	6.75–7.25	..	7.00–7.50	..	7.00–7.50

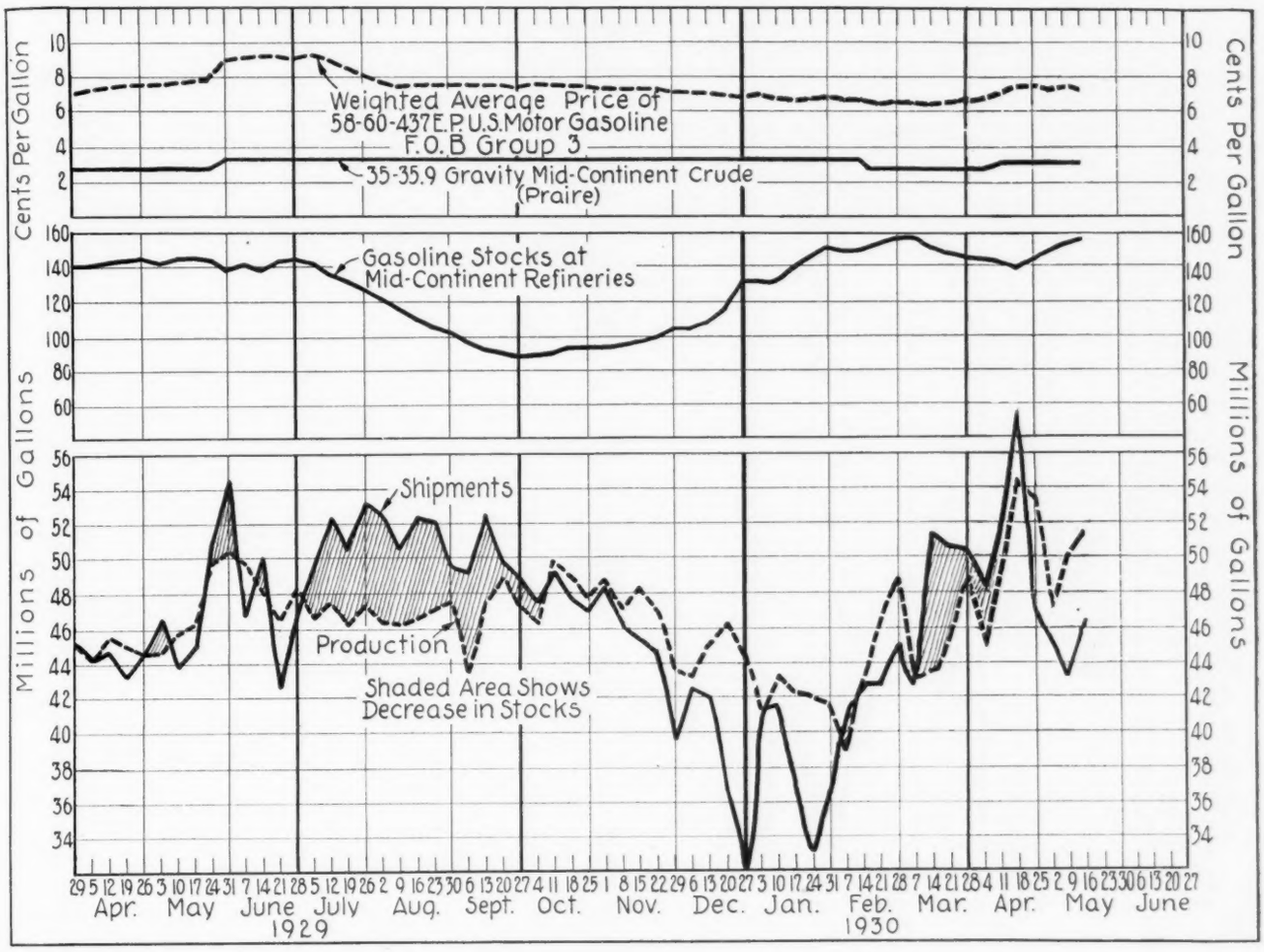
KANSAS

	May 19		May 12		May 5	
	No. of cars	Price	No. of cars	Price	No. of Cars	Price
58-60 U. S. Motor, 437 e.p.	1	7.7500	2	7.6875	No sales reported	

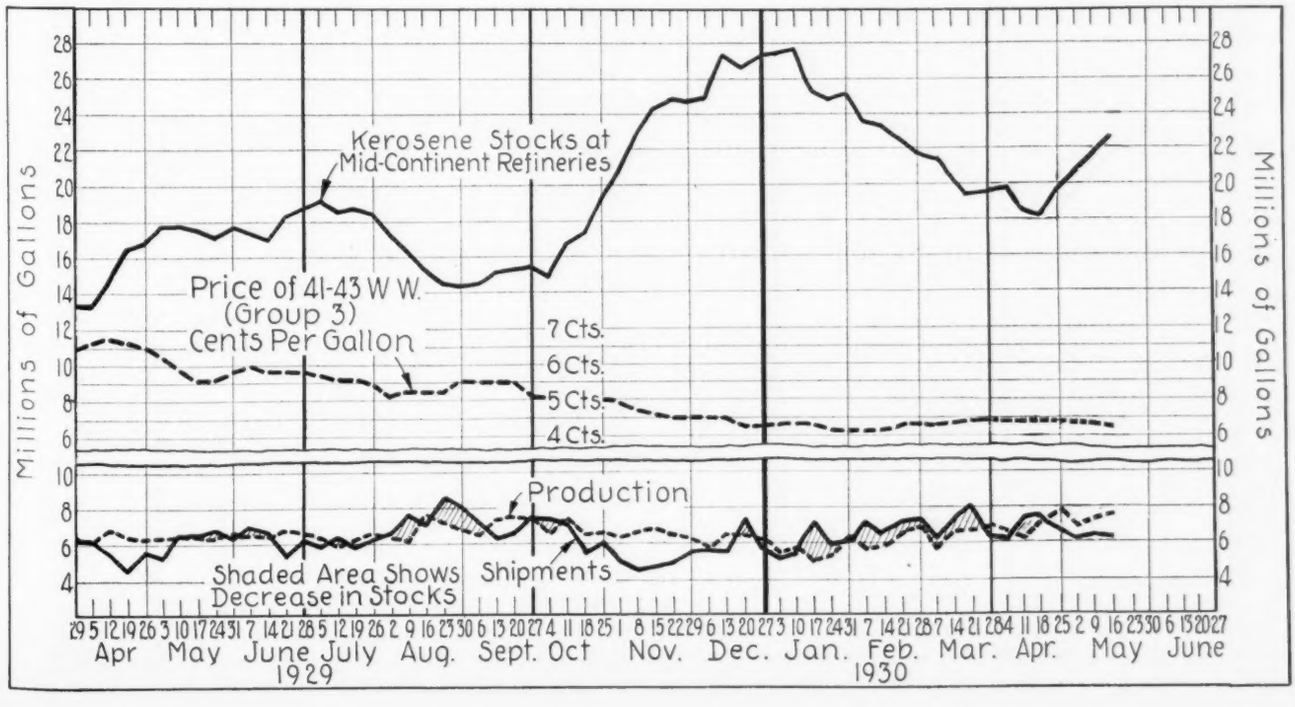
*Full U. S. Motor specifications not guaranteed.

Barometer of Mid-Continent Refinery Market—Week Ending May 16

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 98 Plants to National Petroleum News


Cents Per Gallon
Weighted Average Price of 58-60-437 E.P.U.S. Motor Gasoline F.O.B Group 3
35-35.9 Gravity Mid-Continent Crude (Praire)
Gasoline Stocks at Mid-Continent Refineries
Millions of Gallons
Shipments
Production
Shaded Area Shows Decrease in Stocks
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
1929
1930

Prices shown above are extended to date shown in Refinery Market and Crude tables in Market section of this issue and stocks, shipments and Production are extended to date as shown in the table on page 122



Refinery Markets on Light Oils and Lubricants

Prices given below are in cents per gallon, except where $ is shown. They represent prices made only to domestic jobbers who resell to the consuming public, except where otherwise noted.

(These Refinery Prices compiled in the OIL PRICE HANDBOOK for a whole year)

GASOLINE AND NAPHTHA

OKLAHOMA (F. o. b. Oklahoma refineries)

	Prices May 19	Prices May 12	Prices May 5
48-50 450 e.p. naphtha...	7.00 – 7.25	7.00 – 7.25	7.00 – 7.25
50-52 450 e.p. naphtha...	7.125– 7.25	7.125– 7.25	7.125– 7.25
56-58 450 e.p. gasoline...	7.00 – 7.25	7.00 – 7.25	7.00 – 7.25
58-60 450 e.p. gasoline...	7.00 – 7.25	7.00 – 7.25	7.00 – 7.25
64-66 390 e.p. gasoline...	7.75 – 8.00	7.75 – 8.00	7.75 – 8.00
68-70 350-360 e.p. gasoline	8.75	8.75	8.75
‡Domestic Aviation Gasoline.....	9.00 –10.00	9.00 –10.00	9.50 –10.50

‡Prices based on U. S. Gov't. specifications or better. Present Gov't. specifications require distillation range of 5% recovery at not more than 167° F., and not less than 122° F.; 50% rec. at 221°; 90% at 311°; 96% at 347°; end point, 374°F. Fighting grade in some instances sells at a premium over domestic aviation grade.

PENNSYLVANIA (F. o. b. Western Pennsylvania refineries)

52-54 Naphtha.....	7.50 – 7.75	7.50 – 7.75	7.75
54-56 Naphtha.....	7.75 – 8.00	7.75 – 8.00	7.75 – 8.00
58-60 U.S. Motor 437 e.p.	8.375– 8.50	8.25 – 8.75	8.25 – 8.75
60-62 400-410 e.p. gasoline	8.50 – 9.00	8.50 – 9.00	8.50 – 9.00
64-66 390 e.p. gasoline....	8.75 – 9.50	8.75 – 9.50	8.75 – 9.50
68-70 350-360 e.p.....	9.25 – 9.75	9.25 – 9.75	9.25 – 9.75

OHIO (Quotations of S. O. Ohio. 4c state tax to be added.)

U. S. Motor Gasoline

Ohio, delivery at any point.....	10.50	10.50	10.50

KANSAS (F. o. b. refinery Kansas destination)

60-62 437 e.p. gasoline...	7.75	7.875	7.875
60-62 400 e.p. gasoline...	7.75 – 8.00	8.00	8.00
64-66 375 e.p. gasoline...	8.25	8.25	8.25

NORTH TEXAS (F. o. b. North Texas refineries)

56-58 450 e.p. gasoline...	6.75	6.75	6.75 – 7.00
58-60 450 e.p. gasoline...	6.75	6.75	6.75 – 7.00
58-60 U.S. Motor 437 e.p.	6.75 – 7.25	6.875– 7.375	7.125– 7.375
60-62 400 e.p. gasoline...	7.50	7.50 – 7.75	7.50 – 7.75
64-66 390 e.p. gasoline...	7.75	7.875– 8.00	7.875– 8.00
64-66 375 e.p. gasoline...	8.00	8.00 – 8.25	8.00 – 8.25
68-70 350-360 e.p. gasoline	8.375– 8.50	8.375– 8.50	8.375– 8.50

****WEST TEXAS** (F. o. b. West Texas refinery, for unrestricted shipment)

50-52 naphtha.....	6.50	6.75	7.00
58-60 437 e.p. gasoline...	6.50 – 6.75	6.75 – 7.00	7.25
58-60 U.S. Motor 437 e.p. gasoline.....	7.00 – 7.25	7.25	7.50

NORTH LOUISIANA (N. La., Ark. and Miss. destination)

58-60 U.S. Motor 437 e. p.	7.75	7.75	7.75

ARKANSAS (Ark., N. La. and Miss. destination)

58-60 U.S. Motor 437 e.p.	7.75	7.75	7.75

CALIFORNIA (3c tax to be added to California gasoline prices if used n state.)

54-58 U.S. Motor 437 e.p.	8.25 – 9.50	8.00 – 9.50	9.50 –10.50
54-58 U.S. Motor, for outside state shipment....	7.50 – 8.75	7.50 – 8.75	8.00 – 9.00
58-61 375-400 e.p. gasoline	9.00 –11.00	9.00 –11.00	10.50 –12.00
42-45 Engine Distillate 445-480 e.p.....	7.00 – 8.00	7.00 – 8.00	7.00 – 8.00

NATURAL GASOLINE

(Note: End point of all grades, not over 375 F. Corrosion test adopted Oct. 1, 1927; A.S.T.M. Method D130-27T; doctor test, July 2, 1928.)

OKLAHOMA (F. o. b. Oklahoma refineries)

Grade AA, 80-87.9, 90% Recovery.....	6.375	6.50	6.50 – 6.625
Grade A, 72-79.9, 90% Recovery.....	6.50	6.50	6.50
Grade BB, 84-92, 85% Recovery.....	6.125– 6.25	6.25	6.50
Grade B, 76-83.9, 85% Recovery.....	6.25	6.50	6.50
Grade C, 80-92, 78% Recovery.....	6.125– 6.25	6.25	6.50

NORTH TEXAS (F. o. b. Breckenridge)

Grade AA, 80-87.9, 90% Recovery.....	6.375	6.50	6.50
Grade A, 72-79.9, 90% Recovery.....	6.50	6.50	6.50
Grade BB, 84-92, 85% Recovery.....	6.125– 6.25	6.25	6.50
Grade B, 76-83.9, 85% Recovery.....	6.25	6.50	6.50
Grade C, 80-92, 78% Recovery.....	6.125– 6.25	6.25	6.50

NORTH LOUISIANA (F. o. b. Monroe District)

	Prices May 19	Prices May 12	Prices May 5
Grade AA.....	†6.75 – 7.00	†7.00	†7.00
Grade BB.....	†6.625	†6.875	†6.875
Grade C.....	†6.625	†6.875	†6.875

CALIFORNIA (F. o. b. California refineries)

75-85, 375-390 e.p. blend	7.25 – 8.00	7.25 – 8.00	7.25 – 8.00

BURNING OILS

PENNSYLVANIA (F. o. b. Western Pennsylvania refineries)

45 w.w. kerosene.....	5.375– 5.75	5.375– 5.75	5.50 – 5.875
46 w.w. kerosene.....	5.75 – 6.00	5.75 – 6.00	5.75 – 6.25
47 w.w. kerosene.....	6.00 – 6.25	6.125– 6.375	6.125– 6.375
300 mineral seal.....	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00

OKLAHOMA (F. o. b. Oklahoma refineries)

41-43 w.w. kerosene.....	4.125– 4.25	4.25	4.25 – 4.375
42-44 w.w. kerosene.....	4.625– 4.75	4.75	4.75

KANSAS (F. o. b. refinery Kansas destination)

41-43 w.w. kerosene.....	4.75	4.75	4.875– 5.00
42-44 w.w. kerosene.....	5.00 – 5.25	5.00 – 5.25	5.00 – 5.25

NORTH TEXAS (F. o. b. North Texas refineries)

40-42 w.w. kerosene.....	4.00	4.00	4.125
41-43 w.w. kerosene.....	4.00 – 4.25	4.00 – 4.25	4.25

NORTH LOUISIANA (N. La., Ark. and Miss. destination)

41-43 w.w. kerosene.....	5.00	5.00	5.00
42-44 w.w. kerosene.....	5.25	5.25	5.25

ARKANSAS (Ark., N. La. and Miss. destination)

42-44 w.w. kerosene.....	5.25	5.25	5.25

CALIFORNIA (F. o. b. California refineries)

38-40 w.w. kerosene.....	4.00 – 5.00	4.00 – 5.00	4.00 – 5.00

NEUTRAL OIL

PENNSYLVANIA (F. o. b. Western Pennsylvania refineries)

Vis.		(Viscosity at 70° F.)	
200 No. 3 Assoc. Filt....	25.00 –26.00	25.00 –26.00	25.00 –26.00
180 No. 3 Assoc. Filt....	20.50 –22.00	21.00 –22.00	21.00 –22.00
150 No. 3 Assoc. Filt....	15.00 –16.00	15.25 –16.50	15.25 –16.50
		(Non Viscous)	
34 Grav. 330-340 Flash..	6.50 – 7.00	6.50 – 7.00	7.00 – 7.50

****OKLAHOMA** (F. o. b. Oklahoma refineries)

Vis.	Color	(Viscosity at 100° F.)		
100—No. 2.....		6.00 – 7.50	6.00 – 7.50	6.00 – 7.50
150—No. 3.....		8.00 – 9.00	8.00 – 9.00	8.00 – 9.00
150—No. 4.....		7.00 – 8.50	7.00 – 8.50	7.00 – 8.50
180—No. 3.....		9.00 –10.50	9.00 –10.50	9.00 –10.50
180—No. 4.....		9.00 –10.00	9.00 –10.00	9.00 –10.00
180—No. 5.....		8.50 – 9.50	8.50 – 9.50	8.50 – 9.50
200—No. 3.....		12.00	12.00	12.00
200—No. 4.....		10.00 –11.50	10.00 –11.50	10.00 –11.50
200—No. 5.....		10.50 –11.00	10.50 –11.00	10.50 –11.00
220—No. 3.....		12.50 –13.50	12.50 –13.50	12.50 –13.50
220—No. 4.....		12.00 –12.50	12.00 –12.50	12.00 –12.50
220—No. 5.....		11.00 –12.00	11.00 –12.00	11.00 –12.00
240—No. 3.....		13.50 –15.50	13.50 –15.50	13.50 –15.50
240—No. 4.....		12.50 –14.50	12.50 –14.50	12.50 –14.50
240—No. 5.....		12.00 –14.00	12.00 –14.00	12.00 –14.00
280—No. 3.....		17.00 –18.00	17.00 –18.00	17.00 –18.00
280—No. 4.....		15.00 –17.00	15.00 –17.00	15.00 –17.00
280—No. 5.....		14.00 –15.50	14.00 –15.50	14.00 –15.50

†Prices nominal ††Only one refiner quoting *Quotations only **Represents Both Sales and Quotations.

Refinery Markets Wax, Lubricants, Heavy Oil

Prices given below are in cents per gallon, except where $ is shown. They represent prices made only to domestic jobbers who resell to the consuming public, except where otherwise noted.

(For quick reference to Refinery Prices, get the OIL PRICE HANDBOOK, published annually)

GULF COASTAL (F. o. b. Gulf Coastal refineries)

Vis.	Color	Prices May 19	Prices May 12	Prices May 5
		(Viscosity at 100° F., pour test 0)		
100	No. 2 Pale	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00
200	No. 3 Pale	9.50 – 9.75	9.50 – 9.75	9.50 – 9.75
300	No. 3 Pale	10.75 –11.00	10.75 –11.00	10.75 –11.00
500	No. 3½ Pale	12.00 –12.25	12.00 –12.25	12.00 –12.25
750	No. 4 Pale	13.50 –13.75	13.50 –13.75	13.50 –13.75
1200	No. 5 Pale	16.00 –16.50	16.00 –16.50	16.00 –16.50
200	No. 5½ Red Oil	8.75 – 9.00	8.75 – 9.00	8.75 – 9.00
300	No. 5½ Red Oil	10.00 –10.25	10.00 –10.25	10.00 –10.25
500	No. 6 Red Oil	11.25 –11.50	11.25 –11.50	11.25 –11.50
750	No. 6 Red Oil	12.75 –13.00	12.75 –13.00	12.75 –13.00
1200	No. 5-6 Red Oil	15.00 –15.25	15.00 –15.25	15.00 –15.25

‡CALIFORNIA (F. o. b. California refineries)

Vis.	Color	(Viscosity at 100° F.)		
100	No. 3	9.50 –10.00	9.50 –10.00	9.50 –10.00
200	No. 3	11.50	11.50	11.50
300	No. 3	13.00	13.00	13.00
450	No. 3	15.50	15.50	15.50
550	No. 3	16.50	16.50	16.50
600	No. 3	17.00	17.00	17.00
200	No. 5	11.00	11.00	11.00
300	No. 5	12.00	12.00	12.00
400	No. 5	14.00	14.00	14.00
500	No. 5	15.00	15.00	15.00
600	No. 5	16.00	16.00	16.00
700	No. 7	18.00	18.00	18.00

‡Neutral oils not manufactured commercially in California.

CYLINDER STOCKS

OKLAHOMA (F. o. b. Oklahoma refineries)

190-200 Vis. D at 210° Brt. St.	41.00 –42.00	41.00 –42.00	41.00 –42.00
150-160 Vis. D at 210° Brt. St., 15-20 cold test	37.00	37.00	37.00
150-160 Vis. D Brt. Stock, 25-45 cold test	36.00 –36.50	36.00 –36.50	36.00 –36.50
150-160 Vis. E 210° Brt. St.	34.00 –35.00	34.00 –35.00	34.00 –35.00
600 St. Ref. Olive Green	9.00 –10.00	9.00 –10.00	9.00 –10.00
600 St. Ref. Dark Green	9.00	9.00	9.00
Black Oil	5.00	5.00	5.00

Note: Oklahoma cylinder stock prices as of May 19 represent quotations only to domestic jobbers.

PENNSYLVANIA (F. o. b. Western Penna. refineries) (A.S.T.M. Tests)

600 Steam Refined, filterable	20.00 –21.00	21.00 –23.00	21.00 –23.00
650 Steam Refined	28.00 –29.00	28.00 –29.00	28.00 –30.00
600 Flash	29.50 –32.00	31.00 –33.00	31.00 –33.00
630 Flash	34.50 –35.00	35.00 –36.00	35.00 –36.50
600 Warren E	28.50 –29.50	28.50 –29.50	29.50 –30.00
600 Oil City E	27.50 –28.50	27.50 –28.50	29.00 –29.50
600 D Filtered	34.00 –35.00	34.00 –35.00	34.00 –35.00
Cold Test Stock, 40-50 p. p., 140-150 vis. at 210° 540-550 flash, No. 8 color	38.50 –40.00	38.50 –40.00	39.00 –41.00
40-50 p.p., 140-150 vis. at 210°, 540-550 flash, No. 6-6½ color diluted	37.50 –39.00	38.00 –39.00	38.00 –40.00

WAX

PENNSYLVANIA (Per pound, F. o. b. New York)

122-124 white crude scale, a.m.p.	2.50 – 2.625	2.50 – 2.625	2.50 – 2.625
124-126 white crude scale, a.m.p.	2.50 – 2.625	2.50 – 2.625	2.50 – 2.625

****OKLAHOMA** (Per pound in barrels; in a few instances, per pound in burlap bags; F. o. b. Oklahoma refineries)

124-126 White Crude Scale, a.m.p.	2.375	2.375	2.375

DISTILLATE, GAS AND FUEL OIL

PENNSYLVANIA (For outside Pittsburgh district)

36-40 fuel oil	4.00 – 4.25	4.00 – 4.375	4.00 – 4.375
30-34 fuel oil	3.625– 3.75	3.75 – 4.00	3.75 – 4.00
28-32 fuel oil	3.625– 3.75	3.75 – 4.00	3.75 – 4.00

OKLAHOMA (F. o. b. Oklahoma refineries)

	Prices May 19	Prices May 12	Prices May 5
38-40 straw distillate	3.00 – 3.25	3.00 – 3.25	3.00 – 3.25
36-38 straw distillate	2.875	2.875	2.875
32-36 straw gas oil	2.50 – 2.75	2.50 – 2.75	2.50 – 2.75
32-36 straw gas oil zero	2.75 – 3.00	2.75 – 3.00	3.00
32-36 dark gas oil	2.25 – 2.50	2.25 – 2.50	2.375– 2.50
32-36 dark gas oil zero	2.50 – 2.75	2.50 – 2.75	2.50 – 2.75
28-30 zero fuel oil (per bbl.)	$0.90 – 0.95	$0.90 – 0.95	$0.90 – 0.95
28-30 fuel oil (per bbl.)	$0.85 – 0.90	$0.85 – 0.90	$0.875– 0.90
26-28 fuel oil (per bbl.)	$0.80 – 0.85	$0.80 – 0.85	$0.825– 0.875
24-26 fuel oil (per bbl.)	$0.75 – 0.80	$0.75 – 0.80	$0.775– 0.80
22-26 fuel oil (per bbl.)	$0.65 – 0.75	$0.65 – 0.75	$0.65 – 0.75
18-22 fuel oil (per bbl.)	$0.575– 0.625	$0.575– 0.625	$0.60 – 0.65
16-20 fuel oil (per bbl.)	$0.55 – 0.60	$0.55 – 0.60	$0.55 – 0.60
14-16 fuel oil (per bbl.)	$0.50 – 0.575	$0.50 – 0.575	$0.50 – 0.575

KANSAS (F. o. b. refinery Kansas destination)

38-40 straw distillate	3.50	3.50	3.50 – 3.75
36-38 straw distillate	3.00	3.00	3.25
32-36 straw gas oil	3.00	3.00	3.25 – 3.50
18-22 fuel oil (per bbl.)	$0.75 – 0.80	$0.75 – 0.80	$0.80 – 0.85
10-14 fuel oil (per bbl.)	$0.70 – 0.725	$0.70 – 0.725	$0.725– 0.775

NORTH TEXAS (F. o. b. North Texas refineries)

38-40 straw distillate	3.00	3.00 – 3.25	3.00 – 3.25
38-40 p.w. treated distillate	3.25	3.25	3.25
32-36 gas oil, cracked	2.375– 2.50	2.375– 2.50	2.50
32-36 St. reduced gas oil	2.25 – 2.50	2.25 – 2.50	2.375– 2.50
24-26 fuel oil (per bbl.)	$0.60	$0.60	$0.60 – 0.65
20-24 fuel oil (per bbl.)	$0.50	$0.50	$0.50 – 0.55
18-22 fuel oil (per bbl.)	$0.45	$0.45	$0.45 – 0.50

****WEST TEXAS** (F. o. b. West Texas refinery, for unrestricted shipment)

34-38 gas oil	2.50	2.50	2.50 – 2.75
30-32 gas oil	2.25 – 2.50	2.25 – 2.50	2.25 – 2.50
28-30 zero gas oil	2.50	2.50	2.50 – 2.875
18-22 fuel oil (per bbl.)	$0.60 – 0.65	$0.60 – 0.80	$0.60 – 0.80

NORTH LOUISIANA (N. La., Ark. and Miss. destination)

32-36 gas oil, dark	2.75	2.75	2.75
30-32 gas oil, straw	2.75	2.75	2.75
14-16 fuel oil (per bbl.)	$0.75 – 0.85	$0.75 – 0.85	$0.75 – 0.85

ARKANSAS (Ark., N. La. and Miss. destination)

30-32 gas oil, straw	2.75	2.75	2.75
32-36 dark gas oil	2.75	2.75	2.75
28-30 gas oil	2.50	2.50	2.50
20-24 fuel oil (per bbl.)	$0.95	$0.95	$0.95
9-12 fuel oil (per bbl.)	$0.75	$0.75	$0.75
Black oil	3.25	3.25	3.25

CALIFORNIA (F. o. b. San Joaquin Valley. Nominal pipe line charge to San Francisco 24c per bbl. more and to San Pedro 20c per bbl. more.)

14-18 fuel oil (per bbl.)	$0.50 –$0.65	$0.50 –$0.65	$0.50 –$0.65
14-18 Bunker oil (per bbl.)	$0.70 –$0.80	$0.70 –$0.80	$0.70 –$0.80
30-34 gas oil (per bbl.)	$0.80 –$1.00	$0.80 –$1.00	$0.80 –$1.00
27 Plus Diesel oil (per bbl.)	$0.80 –$0.95	$0.80 –$0.95	$0.80 –$0.95

PETROLATUMS

PENNSYLVANIA (Per pound, in barrels, carload lots, f. o. b. refinery. In tank cars 5/16c to ¾c per pound less.) Two refiners quoting.

Snow White	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
Lily White	7.25 – 7.50	7.25 – 7.50	7.25 – 7.50
Cream White	6.25 – 6.50	6.25 – 6.50	6.25 – 6.50
Light Amber	3.375– 3.625	3.50 – 3.625	3.50 – 3.625
Amber	3.125– 3.375	3.25 – 3.375	3.25 – 3.375
Red	2.875– 3.00	3.00	3.00

PETROLEUM COKE

****OKLAHOMA** (F. o. b. Oklahoma refineries)

(Per ton in car lots)

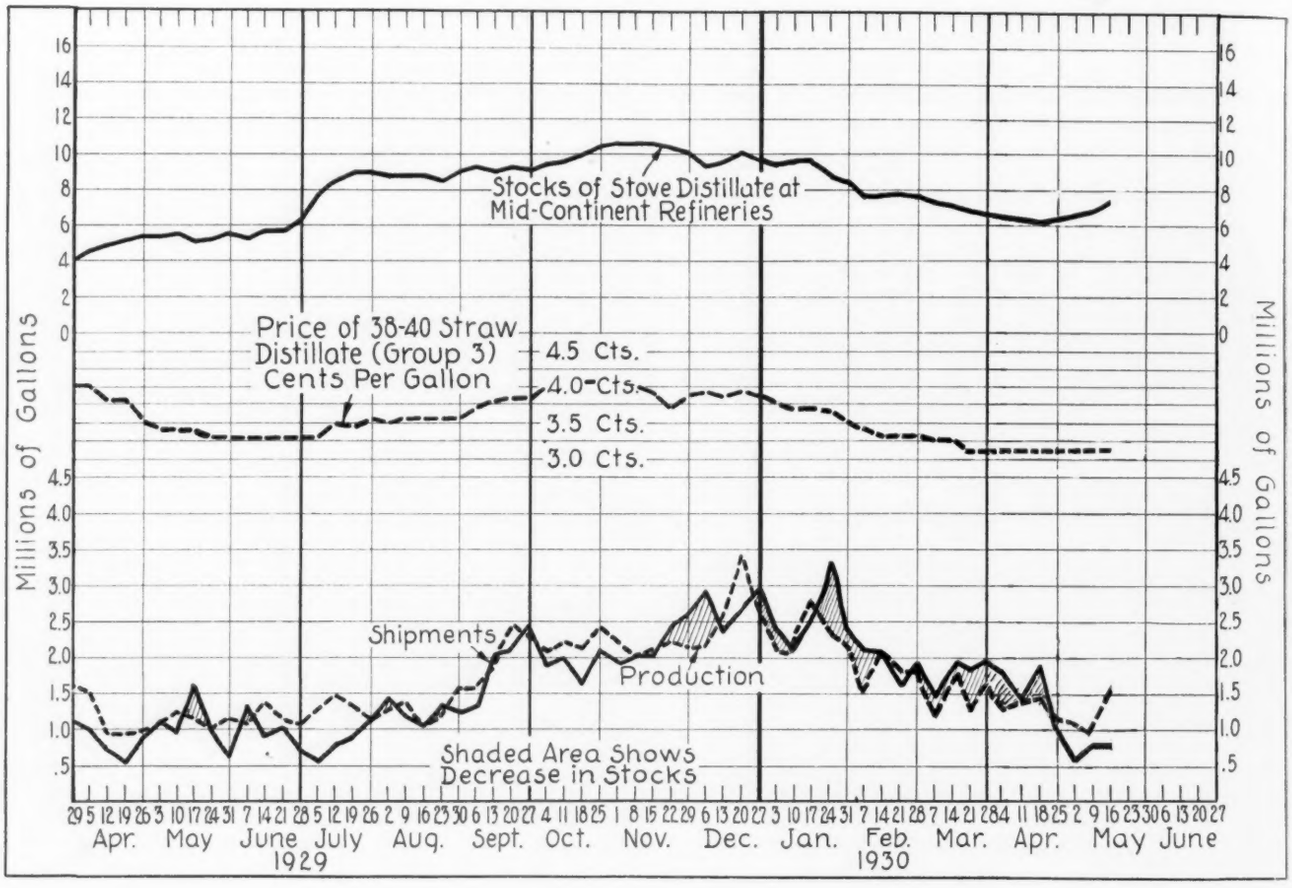
Lump	$4.50 – 5.00	$4.50 – 5.00	$4.50 – 5.00
Still run	$3.00	$3.00	$3.00
Breeze	$2.00	$2.00	$2.00

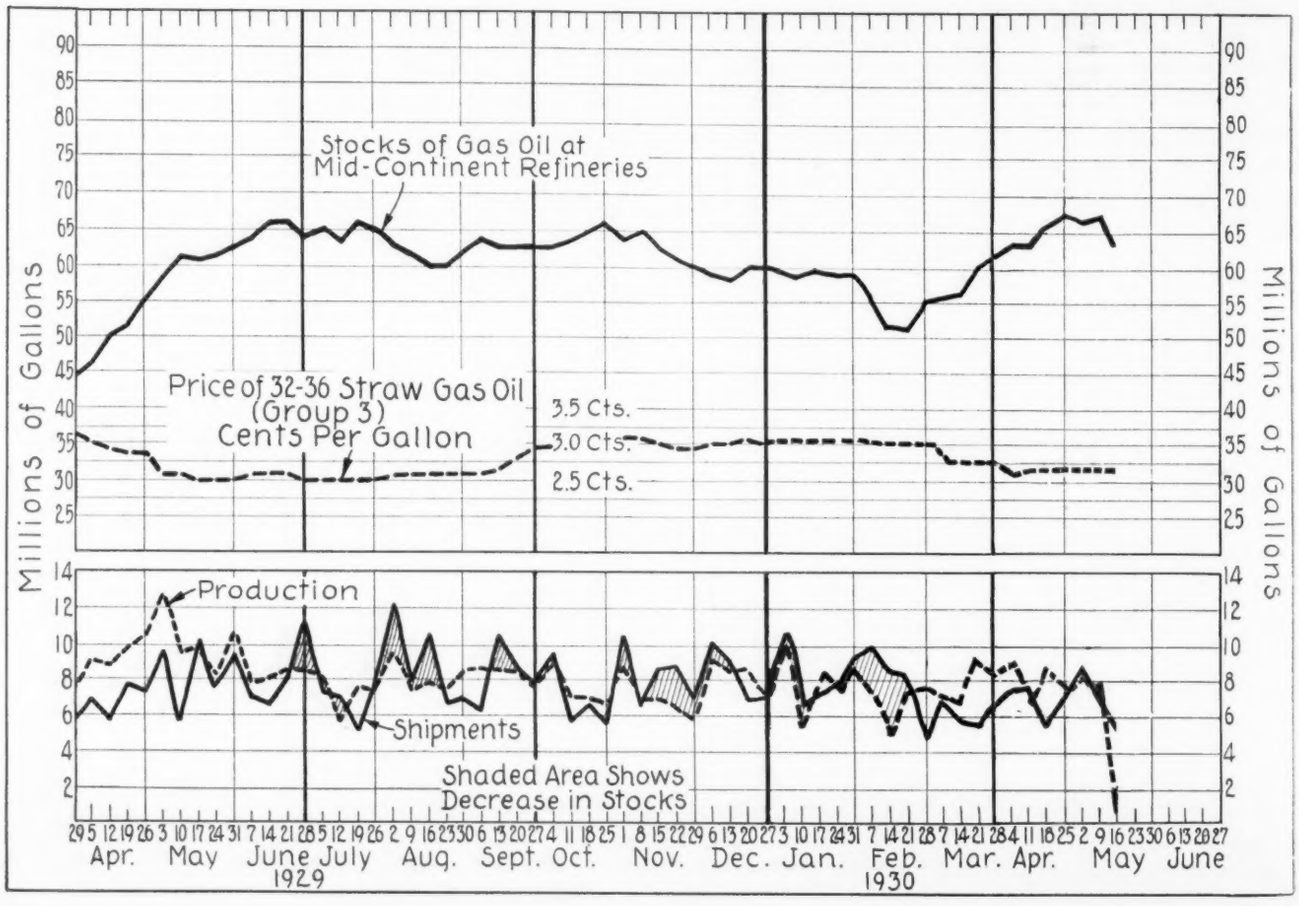
†Prices nominal ††Only one refiner quoting *Quotations only

**Represents Both Sales and Quotations.

Barometer of Mid-Continent Refinery Market—Week Ending May 16

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News


Stocks of Stove Distillate at Mid-Continent Refineries
Price of 38-40 Straw Distillate (Group 3) Cents Per Gallon
4.5 Cts.
4.0 Cts.
3.5 Cts.
3.0 Cts.
Shipments
Production
Shaded Area Shows Decrease in Stocks
Millions of Gallons
Millions of Gallons
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
1929
1930


Stocks of Gas Oil at Mid-Continent Refineries
Price of 32-36 Straw Gas Oil (Group 3) Cents Per Gallon
3.5 Cts.
3.0 Cts.
2.5 Cts.
Production
Shipments
Shaded Area Shows Decrease in Stocks
Millions of Gallons
Millions of Gallons
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
1929
1930

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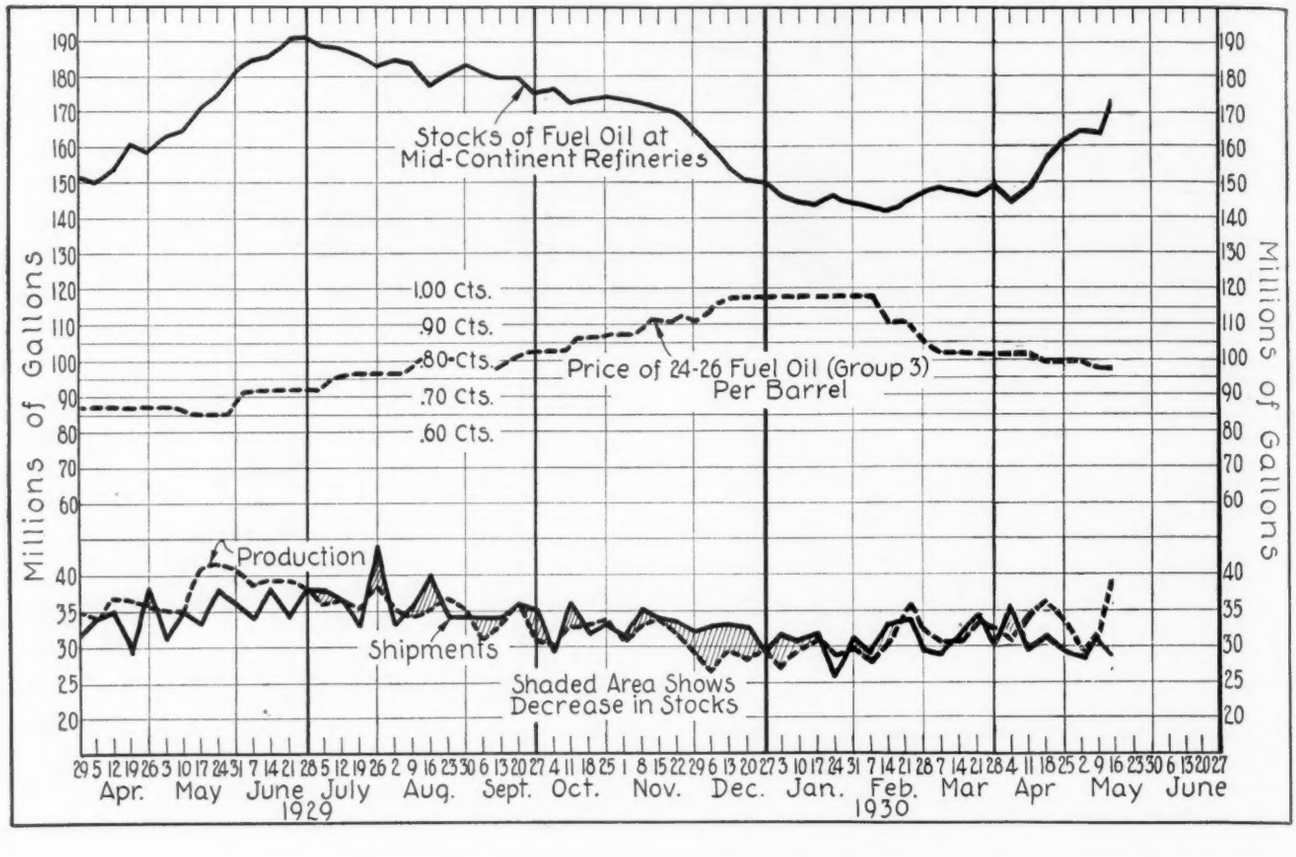
Barometer of Mid-Continent Refinery Market—Week Ending May 16

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News



California Refinery Market

Foreign Inquiries More Numerous

LOS ANGELES, May 17

CALIFORNIA exporters reported receiving numerous inquiries from Pacific foreign and Atlantic foreign buyers the past week. Few of the inquiries resulted in actual business. However, aside from the concern expressed over the reluctance of some operators in flush California fields to curtail crude oil production, a slightly more optimistic tone was noted in west coast markets.

Several brokers reported an English buyer was inquiring for approximately 340,000 barrels of 390 end point gasoline for June, July, and August lifting. The buyer indicated a willingness to pay the Export Association's posted price of 7.75 cents for this commodity.

Inquiries from Australia reported by several local shippers were not taken by the trade to indicate new business but rather as an effort of buyers to check prices that had been quoted them. Charter rates on available tankers were at a high level the past week. The last fixture reported was at $1.17 per barrel on a clean boat. Many of the trade are not optimistic concerning spot business with Atlantic seaboard buyers until these rates come down.

In addition to the inquiries for refined products an English buyer was reported inquiring for a cargo of crude oil, following the recent purchase by a Japanese buyer of a cargo of Elwood crude at a reported premium of 17 cents per barrel.

Local market conditions on the west coast continued below par during the past week with Southern California retail markets in a turmoil and quotations on gasoline fluctuating above and below previous figures.

With checks on the way for payment of the first quarterly gasoline tax, some independent refiners who have been forced to unload U. S. Motor gasoline at low figures to raise the necessary cash are expected to increase their prices early next week.

Although several members of the trade increased their quotations for U. S. Motor 0.50 cent early in the week, they were forced to drop to previous quotations to secure any business. One broker reported he had failed to close a deal on 5 cars of gasoline at 8.50 cents. Others reported sales of one and two cars at 8.25 cents with the bulk of business moving at between 8.50 and 9 cents for use in the state, exclusive of tax.

U. S. motor gasoline for shipment into adjoining states moved at previous quotations with few spot sales reported.

Water white kerosene was inactive. Quotations for this product ranged from 4 to 5 cents with little being sold at any price. A member of the local trade stated he could negotiate the sale of 1,000,000 gallons of this commodity for between 3.75 and 3.875 cents if a buyer could be found.

Quotations on other refinery products remained unchanged during the past week although inquiries for fuel oils were slightly better.

Pennsylvania Market

Activity Ceases After Crude Cut

CLEVELAND, May 17.—Refined oil prices up to the close of business Saturday had reacted very little to the 25-cent cut in Pennsylvania crude made May 16. Trading had been on an extremely small scale prior to the cut. There was almost a complete cessation of activity thereafter, according to reports from most sections of the field.

Further recessions in prices were noted for kerosenes, cylinder stocks and bright stocks during the early days of the week. Water white kerosene, 45 gravity, sold more freely at 5.375 cents. Occasional sales were reported slightly lower.

Filterable 600 steam refined sold at 20 cents a gallon. It was still plentiful at this price at the end of the week. Small lots of No. 8 color bright stock went at 38 cents. The general market had not moved down to this level up to the close of business Saturday, however.

Gasoline, fuel oil and neutral oil prices held their own—remarkably well in the opinion of most traders considering the light demand and lower crude costs.

Consensus among the trade was that it would be the middle of next week before any effect the crude cut might have on refined oil prices would be evident.

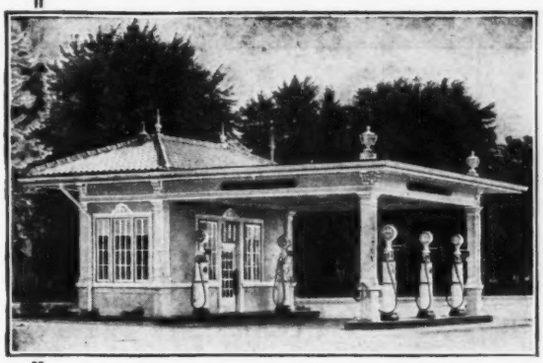
Rohde Elected President Of Wisconsin Jobbers

MILWAUKEE, May 14.—H. A. Rohde, vice-president of the Rohde-Deuster-Hinkley Oil Co., West Allis, was elected president of the Wisconsin Petroleum Association at the convention here May 14. Mr. Rohde was secretary of the association.

Other officers elected are W. L. Zust, Inter-State Oil Co., La Crosse, vice-president; Elmer Tedley, Tedley Oil Co., Kenosha, secretary; and M. G. Peeters, Wadhams Oil Co., Milwaukee, treasurer. Directors are J. M. McLaughlin, Wadhams Oil Co., Milwaukee, retiring president; Ray Andrew, Pennsylvania Oil Co. of Wisconsin, Madison; and C. H. Lockwood, Lockwood Oil Co., Kenosha.

Three speakers were on the convention program. George Schwert, assistant manager of The Texas Co. at Minneapolis, spoke on the code of ethics. H. W. Blakeslee, Wisconsin Newspaper Association, Chicago, spoke on the value of newspaper and radio advertising for the oil jobber. K. G. Kurpenacher, a Wisconsin State Highway Commissioner, talked on the gasoline tax.

EDWARDS



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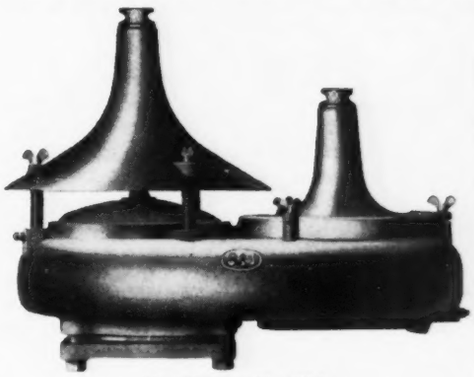
FACTS



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Eastern Domestic Markets

Gasoline Prices Rise 0.25 to 0.5 Cent

Staff Special
NEW YORK, May 17

TANK car prices for gasoline advanced 0.25 to 0.5 cent in practically all districts along the east coast in the week ended May 17. Continued fair weather helped to create a slightly more optimistic feeling among the trade.

The minimum price for U. S. Motor made by the majority of sellers at New York harbor rose to 8.75 cents early in the week. Only one seller was openly quoting a price lower than this. Several were asking 9 cents and reported a few spot sales.

Prices moved up to a minimum of 9 cents at all points south of New York. Some refiners in the Jacksonville district quoted 9.25 cents. Quotations also were higher in New England districts as the majority of refiners put into effect the plan initiated recently by Standard of New York.

The small amount of price shading that was going on the past week was said to be confined strictly to the New York harbor area. Because of the comparatively thin spot movement in the market as a whole, the business at price concessions caused considerable concern in some quarters. The majority of the trade, however, believed this situation would clear in the near future. Jobbers were expected to be more active in the spot market during the remainder of May. The better weather has caused them to make large withdrawals from storage of gasoline contracted for at the lower prices prevailing in April.

California gasoline prices were unchanged at all points with the exception of a widening in the range of quotations at Baltimore. One seller at this point advanced his price to 9.25 cents.

Eastern market observers do not expect to see a reduction in cargo prices for California gasoline as a result of the cut made by Standard of California in Santa Fe Springs crude prices.

Since the posting of a price by Standard of California at which it will buy cargoes of U. S. Motor gasoline, the eastern trade reports the California bulk market has been much more stable. Several of the eastern trade reported the market had improved to the extent that it was doubtful if a cargo could be purchased at Standard's posted price of 6.50 cents.

Dramatics, Says Meyer, of Price War Report

CLEVELAND, May 16.—"There is a tendency by the press to dramatize the petroleum industry," said C. F. Meyer, president of the Standard Oil Co. of New York, in discussing with NATIONAL PETROLEUM NEWS the recently published reports that a price war with the Royal Dutch-Shell in the Dutch East Indies had been ended.

"Any price revision downward," Mr. Meyer continued, "always seems to be a price war when reported in the press and a fluctuation upward is the end of the war. Fluctuations lately have been upward in the East Indies. Conditions there have been satisfactory for some time."

A New York financial newspaper recently published a cable dispatch from Amsterdam, seat of the Royal Dutch Co. publicity bureau, that difficulties between the Standard and Royal Dutch companies over Indian markets had been settled. Mr. Meyer said there was no reason for the story except to dramatize the petroleum industry.

30% Of Fuel Wasted By Drivers

NEW YORK, May 17.—That the average motor car wastes approximately 30 per cent of the heat value of its fuel through incomplete combustion due to improper carburetor setting is pointed out by the American Petroleum Institute in a new leaflet "Gasoline Is Cheap—But Why Waste It?"

While the industry makes every effort to prevent waste of oil from oil field to the filling station, the driver and his machine, through inefficient operation such as excessive use of the choke, driving at excessive speeds, loose connections, leaks and dragging brakes, cause great waste.

Urging the motorist to make it a motoring vacation, the Institute in another leaflet "Fill 'Er Up" points out the advantages of motor travel as compared with trains, and pictures in glowing colors the beauties of the open road.

Both are meant for mailing with correspondence or for distribution at the service stations and may be had for small charge by writing the Institute at 250 Park Ave., New York.

Gulf Coast Markets

Demand Quiet; Prices Unchanged

Staff Special
NEW YORK, May 17

THE featureless routine which has characterized export and domestic markets at the Gulf for the past month continued to hold them in its grip during the week ended May 17. A foreign buyer was reported in the market for gasoline and a domestic buyer was said to be seeking a quantity of gas oil, but aside from this there was no activity. Prices for all commodities were unchanged in both divisions of the market.

Details of an inquiry from a French buyer for a cargo of gasoline could not be learned. Negotiations were said to be under way, however, and in some quarters it was indicated that the Export Association's posted prices would be shaded by an Independent seller.

It was generally agreed among the trade that the Association's prices could not be bettered on the basis of current quotations in the Mid-Continent. However, a London concern was reported to have a part cargo of gasoline in storage at the Gulf which was purchased before prices advanced in the field. Current costs of material to complete the cargo would be averaged down considerably by the low priced material in storage.

Prices for bunker C fuel oil in cargo lots displayed advancing tendencies. The opinion was expressed in several quarters that oil available at $0.75 per barrel was being cleaned up rapidly. Spot demand has been fairly steady.

A New York company acting in the capacity of a broker reported receiving an inquiry from a domestic buyer for a quantity of 28 gravity low sulfur gas oil. Details of the inquiry were withheld. Gas oil of these specifications was quoted at 3.75 cents a gallon although several of the trade were of the opinion this price might be shaded with firm offer.

Wax Markets

Scale Down With Demand Quiet

NEW YORK, May 17.—Prices for crude scale and several grades of fully refined wax moved downward in the Gulf and New York markets during the past week. There was some inquiry from abroad. A few sales were made to foreign buyers. Domestic buyers also made some inquiry but for the most part the market was dull.

Recessions in quotations came late in the week. Yellow crude scale was quoted at 2.375 cents flat and white crude scale at 2.45 to 2.625 cents in both markets. Three grades of fully refined also were lower in both markets. New York quotations for the fully refined grades were higher, however, than those at the Gulf.

Yellow crude scale has been dormant for several weeks. Only two sellers reported they had received small inquiries the past week. They quoted 2.375 cents per pound at New York against bids of 2.25 cents. Their quotations apparently were too high since no business resulted.

Some sales of white crude scale for prompt shipment were made at 2.45 cents, f.a.s. New York. Contrary to the general opinion of what could be done in this market, one sale was made for shipment in October at that price. As a rule refiners have signified they were uninterested in business for future shipment at current low prices.

Several dealers said 2.45 cents f.a.s. New York could be done for June, July, August and September delivery without a great deal of effort. For prompt shipment, 2.45 cents could be shaded. A foreign buyer reported he had been quoted 2.40 cents from New York but that he wasn't interested in prompt shipments at that price.

Fully refined waxes continued in the doldrums although prices at New York were in slightly firmer position than those at the Gulf. Stocks were said to be heavier at the Gulf and some refiners there and in the Mid-Continent were anxious to ship.

Wax prices will be lower in the immediate future, some of the trade believed, while on the other hand some said prices virtually were on bottom at the present time. Others believed spot business would be transacted at lower figures with quotations for futures remaining at around present levels. However, the entire industry is awaiting with interest the Bureau of Mines report for April. Many traders believe the future of the market hinges on this report.

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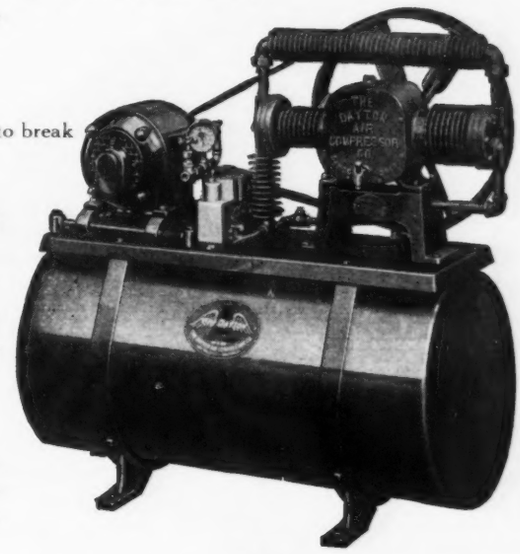

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Complete Seaboard Market

(Export Markets for whole year given in OIL PRICE HANDBOOK. Each volume carries refinery, tank wagon, crude and export markets—complete for the whole year)

Eastern Domestic Market

(Prices for tank car lots, f. o. b. refinery or seaboard terminal, representing majority of sales and quotations. Prices shown below do not include inspection tax levied in some states.)

	Prices May 19	Prices May 12	Prices May 5
U. S. MOTOR GASOLINE			
New York harbor	8.75 – 9.00	8.50 – 9.00	8.25 – 8.75
Portland district	**10.30	**10.125–10.30	**10.50–10.80
Boston district	**10.00	**10.00	**10.125–10.50
Providence district	**10.20	**10.00 –10.20	**10.125–10.50
Philadelphia district	9.00	8.50 – 8.75	8.25 – 8.50
Baltimore district	9.00	8.50 – 9.00	8.25 – 8.50
Norfolk district	9.00	8.50 – 9.00	8.25 – 8.50
Charleston district	9.00	8.50 – 9.00	8.25 – 8.50
Savannah district	9.00	8.50 – 9.00	8.25 – 8.50
Jacksonville district	9.00 – 9.25	8.50 – 9.00	8.25 – 8.50
CALIFORNIA, U. S. MOTOR GASOLINE			
New York harbor	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
Philadelphia district	9.00	9.00	9.00
Baltimore district	9.00 – 9.25	9.00	8.50 – 9.00
‡DOMESTIC AVIATION GASOLINE			
New York harbor	12.00 –13.00	12.00 –12.75	11.50 –12.50
Philadelphia	12.00	11.75 –12.00	11.50
Baltimore	12.00 –12.50	12.00 –12.50	11.50 –12.50
Boston	11.50 –13.00	11.50 –13.00	11.50 –12.50
WATER WHITE KEROSENE			
New York harbor	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
Philadelphia district	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
Baltimore district	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
GAS OIL: 28-34 Gravity			
New York harbor	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25
Boston district	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25
FURNACE OIL: 36-40 Gravity			
New York harbor	6.00 – 6.25	6.00 – 6.25	6.00 – 6.25
Boston district	6.00 – 6.25	6.00 – 6.25	6.00 – 6.25
GRADE C BUNKER OIL (Lighterage 5c per bbl. additional)			
New York Harbor	$1.15	$1.15	$1.15
Boston district	$1.15	$1.15	$1.15
DIESEL OIL			
New York harbor	$2.00 –$2.10	$2.00 –$2.10	$2.00 –$2.10

*Minimum delivered. †Nominal. **Delivered prices.

‡Prices are based on U. S. Gov't. specifications or better. Present Gov't. specifications require distillation range of 5% recovery at not more than 167° F., and not less than 122°F.; 50% recovery at 221°; 90% at 311°; 96% at 347°; end point 374° F. Gasoline of fighting grade specifications in some instances sells at a premium over domestic aviation grade. Prices represent majority of quotations.

New York Export Market

(Lubricating oils are per gal. in bbls. F.a.s. New York)

	May 19	May 12	May 5
CYLINDER OILS (Pennsylvania Products)			
Bright stock, dark	42.50 –45.00	45.00 –47.00	45.00 –47.00
600 D filtered	38.50 –40.00	38.75 –40.00	38.75 –40.00
600 Warren E filtered	33.50 –35.00	35.00 –37.00	35.00 –37.00
600 s.r. unfiltered	27.50 –28.50	28.50 –29.50	28.50 –29.50
650 s.r. unfiltered	35.00 –37.00	35.00 –37.00	35.00 –37.00
600 flash, s.r.	36.50 –38.00	37.50 –40.00	37.50 –40.00
630 flash, s.r.	42.50 –44.00	42.50 –44.00	42.50 –44.00
RED ENGINE OILS (Vis. 100°)			
300 vis. No. 6½ color	20.00 –21.00	20.00 –21.00	20.00 –21.00
250 vis. No. 6 color	17.50 –18.50	17.50 –18.50	17.50 –18.50
200 vis. No. 6 color	16.50 –17.50	16.50 –17.50	16.50 –17.50
PALE ENGINE OILS (Vis. 100°)			
230 vis. No. 3¾ color	23.00 –24.00	23.00 –24.00	23.00 –24.00
180 vis. No. 3¼ color	19.00	19.00	19.00
100 vis. No. 2¼ color	15.50 –16.00	15.50 –16.00	15.50 –16.00
MOTOR OILS (Vis. 100°)			
600 vis. No. 7 color	30.00	30.00	30.00
500 vis. No. 6½ color	26.50 –27.50	26.50 –27.50	26.50 –27.50
400 vis. No. 7¼ color	23.00 –25.00	23.00 –25.00	23.00 –25.00
300 vis. No. 6 color	20.00 –22.00	20.00 –22.00	20.00 –22.00
200 vis. No. 6 color	18.00 –20.00	18.00 –20.00	18.00 –20.00

Wax Markets

(Prices in cents per pound, A.S.T.M. tests; A.M.P. F.a.s. carload lots)

NEW YORK	May 19	May 12	May 5
124-126 Yellow crude scale	2.375	2.375– 2.50	2.375– 2.50
122-124 White crude scale	2.45 – 2.625	2.50 – 2.625	2.50 – 2.625
124-126 White crude scale	2.45 – 2.625	2.50 – 2.625	2.50 – 2.625
123-125 Fully refined	3.50 – 3.625	3.50 – 3.625	3.50 – 3.625
125-127 Fully refined	3.75	3.75 – 3.875	3.75 – 3.875
128-130 Fully refined	3.875– 4.00	3.875– 4.125	3.875– 4.125
130-132 Fully refined	4.25 – 4.50	4.25 – 4.50	4.25 – 4.50
133-135 Fully refined	5.00	5.00 – 5.25	5.00 – 5.25
135-137 Fully refined	5.50	5.50	5.50
NEW ORLEANS			
124-126 Yellow crude scale	2.375	2.375– 2.50	2.375– 2.50
122-124 White crude scale	2.625	2.50 – 2.625	2.50 – 2.625
124-126 White crude scale	2.45 – 2.625	2.50 – 2.625	2.50 – 2.625
123-125 Fully refined	3.50	3.50	3.50
125-127 Fully refined	3.50 – 3.75	3.75	3.75
128-130 Fully refined	3.75 – 4.00	3.875– 4.00	3.875– 4.00
130-132 Fully refined	4.25 – 4.375	4.25 – 4.375	4.25 – 4.375
133-135 Fully refined	4.75 – 5.00	5.00 – 5.25	5.00 – 5.25

Gulf Export Market

(Prices are f. o. b. Gulf oil terminals in Texas and Louisiana, shipments of 20,000 bbls. or more unless otherwise noted. Bulk gasoline and kerosene prices are posted quotations of the Export Petroleum Assoc., Inc., governing about 90% of the gasoline and kerosene shipped to foreign ports from the Gulf)

	Prices May 19	Prices May 12	Prices May 5
GASOLINE			
U. S. Motor	8.00	8.00	8.00
60-62, 400 e.p.	9.00	9.00	9.00
61-63, 390 e.p.	9.25	9.25	9.25
64-66, 375 e.p.	9.50	9.50	9.50
U. S. Motor, cases (cargoes)	$1.85	$1.85	$1.85
64-66, cases (cargoes)	$2.00	$2.00	$2.00
KEROSENE			
44 water white	7.00	7.00	7.00
41-43 prime white	6.00	6.00	6.00
Water white, cases (cargoes)	$1.75	$1.75	$1.75
Prime white, cases (cargoes)	$1.65	$1.65	$1.65
DOMESTIC GAS & BUNKER OILS			
*26-30 translucent gas oil	3.50 – 3.75	3.50 – 3.75	3.50 – 3.75
*30 plus translucent gas oil	3.875– 4.00	3.875– 4.00	3.875– 4.00
Grade C bunker oil	$1.05	$1.05	$1.05
Grade C bunker oil, cargoes	$0.75 –$0.80	$0.75 –$0.80	$0.75 –$0.80
MEXICAN CRUDE AND BUNKER OILS (f. o. b. Steamer, Tampico)			
Heavy Panuco crude taxes to be paid	$0.68 –$0.70	$0.68 –$0.70	$0.68 –$0.70
Grade C bunker oil for bunkering purposes, taxes paid	$1.00	$1.00	$1.00
SOUTH TEXAS LUBRICATING OILS (Viscosity at 100°F. cold test 0 Tanker, f. o. b. Houston)			
100 vis. No. 2 unfiltered pale	5.75 – 6.125	5.75 – 6.125	5.75 – 6.00
200 vis. No. 3 unfiltered pale	8.00 – 8.75	8.00 – 8.75	8.00 – 8.50
300 vis. No. 3 unfiltered pale	8.875– 9.50	8.875– 9.50	8.875– 9.50
500 vis. No. 3½ unfiltered pale	10.25 –11.25	10.25 –11.25	10.25 –11.25
750 vis. No. 4 unfiltered pale	12.50 –13.25	12.50 –13.25	12.50 –12.75
1200 vis. No. 5 unfiltered pale	16.00 –18.00	16.00 –18.00	16.00 –18.00
200 vis. No. 5-6 red oil	7.00 – 7.50	7.00 – 7.50	7.00 – 7.25
300 vis. No. 5-6 red oil	8.375– 8.75	8.375– 8.75	8.375– 8.50
500 vis. No. 5-6 red oil	9.25 – 9.50	9.25 – 9.50	9.25 – 9.50
750 vis. No. 5-6 red oil	11.50	11.50	11.50
1200 vis. No. 5-6 red oil	15.00 –15.50	15.00 –15.50	15.00 –15.25

*Less than ½ of 1% sulphur.

Gulf Domestic Market

(Prices are f.o.b. Gulf oil terminals in Texas and Louisiana in shipments of 20,000 bbls. or more, representing sellers' opinions, for domestic shipment only.)

	May 19	May 12	May 5
U. S. Motor gasoline	7.50	7.50	7.25 – 7.50
41-43 w.w. kerosene	5.875– 6.25	5.875– 6.25	5.875– 6.25
*26-32 translucent gas oil	3.75 – 4.00	3.75 – 4.00	3.75 – 4.00

*Less than ½ of 1% sulphur.

Pacific Export Market

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gallon, except where otherwise noted.)

	May 19	May 12	May 5
Gasoline, U. S. Motor, 53-55 Gravity	6.50 – 7.50	6.50 – 7.50	6.50 – 7.50
Gasoline, U. S. Motor-blends and special cuts	7.25 – 8.25	7.25 –10.00	7.25 –10.00
Gasoline, 400 e.p. blends	8.50 – 9.50	.....	.....
Gas Oil, 30-34, per bbl.	$0.80 –$1.00	$0.80 –$1.00	$0.80 –$1.00
Diesel Oil, 27 plus, per bbl.	$0.75 –$0.90	$0.80 –$1.00	$0.80 –$1.00
Bunker oil, 14-18, per bbl.	$0.60 –$0.85	$0.65 –$0.85	$0.65 –$0.85
Fuel oil, 14-18 per bbl.	$0.55 –$0.85	$0.60 –$0.85	$0.60 –$0.85
Kerosene, 38-40 w.w., 125-150 flash, per gal.	4.75 – 5.25	5.00 – 6.00	5.00 – 6.00
Cased Goods			
Gasoline, U. S. Motor	$1.75 –$1.85	$1.75 –$1.85	$1.75 –$1.85
Gasoline, 400 e.p.	$1.85 –$2.00	.....	.....
Kerosene, 38-40 w.w., 125-150 flash	$1.45 –$1.50	$1.45 –$1.50	$1.45 –$1.50

†**Note:** Above Pacific Export market prices for gasoline and kerosene in cargo lots apply only on goods for coastwise shipment. Gasoline and kerosene prices for shipment to foreign ports are determined as follows: Difference in freight between U. S. Gulf to European Continent and California to European Continent —this difference plus 0.125c for handling, deducted from prices posted at U. S. Gulf by the Export Petroleum Assoc., Inc., which are above prices.

Tanker Rates

(Approximate tanker freight rates to Continental ports, in shillings per ton of 2240 pounds, British sterling; to American ports, cents per barrel.)

	May 19 Crude &/or Fuel	May 19 Refined Oil &/or Spirits
Calif. to U. K. or Continental ports*	40	42/6
Gulf to U. K. or Continental ports*	26-28	30-31
North Atlantic to U. K. or Continental ports*	23/6-25	27-28
Calif. to North Atlantic ports (not E. of N. Y.)	$0.90-$1.00	$1.15
Gulf to North Atlantic ports (not E. of N. Y.)**	40	45

*Continental ports in the range between Bordeaux and Hamburg, both inclusive.

**Venezuela loading same rate. For Tampico 3c to 4c per bbl. additional.

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PUMPS AND TANKS FOR THE OIL TRADE

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"DEPENDABLE PUMPS—FOR EVERY SERVICE STATION NEED"

THE STAR SALESMAN G&B

Tank Wagon, Service Station Markets for Gasoline and Kerosene

(OIL PRICE HANDBOOK has t.w. and s.s. markets for a whole year, arranged for quick reference)

These Prices in Effect May 19, 1930, as Posted by Principal Marketing Companies

S.O. NEW JERSEY TERRITORY

	Gasoline Total				Oil
	T.W.	Tax	T W.	S.S.	T.W.
Atlantic City, N. J.	14.5	2	16.5	18.5	13.5
Newark, N. J.	13.5	2	15.5	17.5	12.5
Annapolis	[illegible]	4	18	20	13
Baltimore, Md.	[illegible]	4	17.2	19.2	10.5
Cumberland, Md.	15	4	19	21	14
Washington, D. C.	13.7	2	15.7	17.7	12.7
Danville, Va.	14.8	5	19.8	21.8	13.8
Norfolk, Va.	13.3	5	18.3	20.3	12
Richmond, Va.	13.7	5	18.7	20.7	12.7
Roanoke, Va.	15	5	20	21	14
Petersburg, Va.	14.3	5	19.3	21.3	13.3
Charleston, W. Va.	14.5	4	18.5	20.5	12 5
Keyser, W. Va.	15.1	4	19.1	21.1	14.1
Parkersburg, W. Va.	13.2	4	17.2	19.2	11.2
Wheeling, W. Va.	14.4	4	18.4	20.4	12.4
Charlotte, N. C.	14.3	5	19.3	20.3	14.3
Hickory, N. C.	15.8	5	20.8	22.8	14.8
Mt. Airy, N. C.	15.5	5	20.5	22.5	14.5
Salisbury, N. C.	15.7	5	20.7	20	14.7
Charleston, S. C.	13.3	6	19.3	21.3	12.3
Columbia, S. C.	15.2	6	21.2	23.2	14.2

Note: 2c per gallon discount off t.w. price of gasoline to dealers and commercial consumers thru S. O. New Jersey territory.

CONTINENTAL OIL

Denver, Colo.	13	4	17	20	15.5
Pueblo, Colo.	14	4	18	21	15.5
Grand Junc., Colo.	19	4	23	26	19
Casper, Wyo.	15	4	19	22	14
Cheyenne, Wyo.	16.5	4	20.5	23.5	15.5
Butte, Mont.	19.5	5	24.5	27.5	20
Helena, Mont.	19.5	5	24.5	27.5	20
Salt Lake City, Utah	16.5	3½	20	23	17
Boise, Ida.	18.5	5	23.5	26.5	19
Twin Falls, Ida.	18.5	5	23.5	27.5	19
Albuquerque, N. M.	16	5	21	24	17

S. O. CALIFORNIA

			*Plant		
Phoenix, Ariz.	14	4	18	22	20
Los Angeles, Cal.	18.5	3	21.5	24.5	15.5
Fresno, Cal.	19	3	22	25	17
San Francisco, Cal.	19	3	22	25	15.5
Reno, Nev.	23	4	27	30	19
Portland, Ore.	19.5	4	23.5	26.5	16.5
Seattle, Wash.	19.5	3	22.5	25.5	16.5
Spokane, Wash.	23.5	3	26.5	29.5	20.5
Tacoma, Wash.	19.5	3	22.5	25.5	16.5

Note: 6c per gal. discount to dealers off t.w. price of gasoline to customers taking tank truck delivery, thru S. O. California territory except 1c discount at Phoenix to dealers only.

*Prices in the fourth column represent retail sale prices of gasoline for delivery into fuel tanks of customers' automotive equipment at S. O. California refineries, terminals and district depots as this company operates no retail service stations.

S. O. LOUISIANA

Little Rock, Ark.	13	5	18	19	13
Alexandria, La.	13	4	17	17	†14
Baton Rouge, La.	12	4	16	17	†14
Lake Charles, La.	11	*5	16	16	†14
New Orleans, La.	11	*5	16	16	†12
Shreveport, La.	12	4	16	18	†14
Lafayette, La.	13	*5	18	20	†14
Bristol, Tenn.	15	5	20	22	14
Chattanooga, Tenn.	15	5	20	22	13
Knoxville, Tenn.	15	5	20	22	16
Nashville, Tenn.	14	5	19	21	16
Memphis, Tenn.	13	5	18	20	12.5

Note: 2c per gallon discount off t.w. price of gasoline to dealers thru S. O. Louisiana territory.

*Lake Charles, New Orleans and Lafayette gasoline tax includes 4c state tax and 1c parish tax. New Orleans kerosene price includes 1c parish tax in addition to 1c state tax.

†Kerosene price in Louisiana includes 1c state tax.

S. O. KENTUCKY

Ashland, Ky.	15	5	20	21	15
Catlettsburg, Ky.	15	5	20	21	15
Lexington, Ky.	14	5	19	20	14.5
Louisville, Ky.	15	5	20	22	13
Covington, Ky.	15	5	20	21	14.5
Clarksdale, Miss.	14	5	19	21	12.5
Gulfport, Miss.††	16.5	5	21.5	23.5	13
Jackson, Miss.	15	5	20	22	13

Latest Changes in Tank Wagon Prices

Gasoline

S. O. Ohio—T.w. and s.s. up 2c, Athens county, both to 18c, **May 19.**

S. O. Kentucky—T.w. only up 2c, Macon, to 22c, same as s.s., **May 15.**

T.w. and s.s. up 2c, Savannah, to 21c and 23c, **May 15.**

Kerosene

Magnolia Petroleum—Kerosene cut 1c, Muskogee, to 9c t.w., **May 8.**

	Gasoline Total				Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Natchez, Miss.	14.5	5	19.5	21.5	13
Vicksburg, Miss.	14.5	5	19.5	21.5	13
Birmingham, Ala.‡‡	17	4	21	23	14.5
Mobile, Ala.‡	14	4	18	18	13.5
Montgomery, Ala.*	17	4	21	23	15
Atlanta, Ga.	15	6	21	23	†15.5
Augusta, Ga.	14	6	20	22	†15.5
Macon, Ga.	16	6	22	22	†14
Savannah, Ga.	15	6	21	23	†14
Jacksonville, Fla.	15	6	21	23	14
Miami, Fla.	16	6	22	24	14
Tampa, Fla.	15	6	21	23	13
Pensacola, Fla.**	13	6	19	21	13.5

Note: Net price of gasoline to dealers is 2c under posted t.w. price thru S. O. Kentucky territory.

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.

†Georgia kerosene prices include 1c state tax.

**Both tank wagon prices include 1c city tax at Pensacola which went into effect Oct. 15, 1926.

††Both tank wagon prices at Gulfport include Harrison county privilege tax of 2c.

‡Mobile gasoline prices include 1c city tax.

‡‡Birmingham gasoline prices include 1c city tax.

S. O. NEBRASKA

Omaha, Neb.	15.25	4	19.25	21.25	13.25
McCook	16.75	4	20.75	22.75	14.75
Norfolk	15.75	4	19.75	21.75	13.75
North Platte	16.75	4	20.75	22.75	14.50
Scottsbluff	16.75	4	20.75	22.75	14.25

Note: Discounts: 1c per gal. off tank wagon price of gasoline for 1,000 gallon dumps per month to consumers taking tank wagon delivery only.

S. O. INDIANA

Chicago, Ill.	15	3	18	19	13
Decatur, Ill.	15.2	3	18.2	19.2	13.1
E. St. Louis, Ill.	14.4	3	17.4	18.4	12.2
Joliet, Ill.	15.4	3	18.4	19.4	13.3
Peoria, Ill.	15.2	3	18.2	19.2	13.1
Quincy, Ill.	15.2	3	18.2	19.2	12.9
Indianapolis, Ind.	15.2	4	19.2	20.2	14.2
Evansville, Ind.	15	4	19	20	14
South Bend, Ind.	15.4	4	19.4	20.4	14.4
Detroit, Mich.	15.8	3	18.8	19.8	14.7
Grand Rapids, Mich.	15.7	3	18.7	19.7	14.6
Saginaw, Mich.	15.9	3	18.9	19.9	14.8

	Gasoline Total				Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Green Bay, Wisc.	15.6	2	17.6	18.6	13.4
Madison, Wisc.	15.3	2	17.3	18.3	13.1
Milwaukee, Wisc.	15.1	2	17.1	18.1	12.9
La Cross, Wisc.	16.2	2	18.2	19.2	14
Minneapolis, Minn.	16.2	3	19.2	20.2	13.9
Duluth, Minn.	16.5	3	19.5	20.5	13.9
Mankato, Minn.	16.1	3	19.1	20.1	13.7
Des Moines, Ia.	15.5	3	18.5	19.5	13.3
Davenport, Ia.	15.5	3	18.5	19.5	13.3
Sioux City, Ia.	15.1	3	18.1	19.1	12.9
Mason City, Ia.	15.5	3	18.5	19.5	13.3
St. Louis, Mo.	*14.9	2	16.9	17.9	12.3
Kansas City, Mo.	†15.9	2	17.9	18.9	11.6
St. Joseph, Mo.	†15.5	2	17.5	18.5	12.2
Fargo, N. D.	17.9	3	20.9	21.9	15.9
Grand Forks, N. D.	18.2	3	21.2	22.2	16.2
Minot, N. D.	17.9	3	20.9	21.9	15.9
Pierre, S. D.	16	4	20	21	14.4
Huron, S. D.	16.3	4	20.3	21.3	14.7
Wichita, Kans.	13.8	3	16.8	14.8	11.8
Bartlesville, Okla.	13.5	4	17.5	18.5	11.5

S. O. Indiana's quantity contract price schedule thru territory (except in Chicago and Detroit, which see below) on tank truck deliveries of gasoline, figured from the service station price is 2c for 500 gals. or more a month; 2½c for 2,000 gals. or more a month; 3c for 6,000 gals. or more a month; and 4½c for 100,000 gals. or more a month.

In Chicago and vicinity, these discounts apply: Over 500 gals. per month, 2c per gal. off service station price; over 1,000 gals. per month, 4c per gal. off service station price; over 50,000 gals. per month, 4½c per gal. off s.s. price; over 75,000 gals., 5c off.

In Detroit, dealers and consumers signing contract for all gasoline for one year, get 4c per gal. off s.s. price. Non-contracted accounts get 3c off s.s. price. Those buying 100,000 gals. or more a month, 4½c per gal. off s.s. price.

*Includes city tax of ½c.

†Includes city tax of 1c.

S. O. OHIO

Ohio state-wide	15	4	19	20	†13
Ashtabula, Athens, Hancock, Jackson, Licking, Muskingum, Perry, Preble and Scioto Counties:	14	4	18	18	13
Franklin (except Columbus west of river)	13	4	17	17	13

Note: Discount to dealers and commercial accounts generally thru Ohio is 2c per gal. off t.w. price with some exceptions. In counties where prices are below normal, discount is 3c per gal. off t.w. price.

†Kerosene t.w. price in Darke County is 11c; in Paulding County 12c.

MAGNOLIA PETROLEUM

Muskogee, Okla.	12	4	16	19	9
Oklahoma City	12	4	16	19	10
Tulsa, Okla.	12	4	16	20	10
Fort Smith, Ark.†	10	†4	14	15	12
Little Rock, Ark.	13	5	18	19	13
Texarkana, Ark.*	12	4	16	16	12
Dallas, Tex.	12	4	16	20	12
Fort Worth, Tex.	12	4	16	19	12
Houston, Tex.	11	4	15	19	11
San Antonio, Tex.	11	4	15	19	11
El Paso, Tex.	12	4	16	20	13

*Within city of Texarkana, the state tax on gasoline is 4c per gal. conforming with the Texas state tax. In this district outside of the city the 5c Arkansas tax applies.

†Within city of Fort Smith, Oklahoma tax of 4c applies. In this district outside of the city, the 5c Arkansas tax applies.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

Greater New York City:					
Boroughs of Manhattan, Bronx, Queens & Kings	14.3	2	16.3	18.3	11.3
Borough of Richmond	14.7	2	16.7	18.7	11.7
Albany, N. Y.	15.6	2	17.6	19.6	12.6
Buffalo, N. Y.	14.8	2	16.8	18.8	11.8
Rochester, N. Y.	15	2	17	19	12
Syracuse, N. Y.	15.8	2	17.8	19.8	12.8
Boston, Mass.	14.5	2	16.5	18.5	11.5
Augusta, Me.	15.8	4	19.8	21.8	12.8
Manchester, N. H.	15.4	4	19.4	21.4	12.4

Above prices include these inspection fees on both gasoline and kerosene, per gallon: Alabama, 1/40c on gasoline, 1/2c kerosene; Arkansas, 1/20c on both; Florida, 1/8c on both; Illinois, 3/100c on both; Indiana, 4/25c to 1/2c on both; Kansas, 3/50c on both; Louisiana, 1/32c on gasoline; Minnesota, 3/50c on both; Missouri, 3/10c to 1/2c on both; Nebraska, 3/100c on both; North Carolina, 1/4c on both; North Dakota, 1/20c on both; Oklahoma, 4/25c on both; South Carolina, 1/8c on both; South Dakota, 1/10c on both; Tennessee, 2/5c on gasoline and 1/2c to 4/5c on kerosene; Wisconsin, 3/50c on both.

Kerosene inspection fees only, per gallon; Iowa 7/100c; Michigan 1/5c to 4/5c per gal.

Tank Wagon, Service Station Markets for Gasoline and Kerosene

Prices in Effect May 19, 1930

S. O. NEW YORK

	Gasoline T.W.	Tax	Gasoline Total T.W.	S.S.	Oil T.W.
Burlington, Vt.	16.3	4	20.3	22.3	13.3
New Haven, Conn.	15.6	2	17.6	19.6	12.6
Providence, R. I.	14.7	2	16.7	18.7	11.7

Note: S. O. New York allows 3c off t.w. price to dealers in New York City, and 2c off t.w. price thru rest of territory.

ATLANTIC REFINING

Pittsburgh, Pa.	15	*	15	21	13
Philadelphia, Pa.	15	*	15	21	13
Allentown, Pa.	15	*	15	21	13
Erie, Pa.	15	*	15	21	13
Scranton, Pa.	15	*	15	21	13
Altoona, Pa.	15	*	15	21	13
Dover, Del.	15	3	18	20	13
Wilmington, Del.	15	3	18	20	13
Boston, Mass.	14.5	2	16.5	18.5	11.5
Springfield, Mass.	15.5	2	17.5	19.5	12.5
Worcester, Mass.	15.3	2	17.3	19.3	12.3
Fall River, Mass.	14.1	2	16.1	17.1	12.1
Providence, R. I.	14.7	2	16.7	18.7	11.7
Hartford, Conn.	15.5	2	17.5	19.5	12.5
New Haven, Conn.	15.6	2	17.6	19.6	12.6
Atlantic City, N. J.	14.5	2	16.5	18.5	13.5
Camden, N. J.	13.6	2	15.6	17.6	12.6
Trenton, N. J.	14	2	16	18	13
Annapolis, Md.	14	4	18	20	13
Baltimore, Md.	13.2	4	17.2	19.2	10.5
Hagerstown, Md.	14.7	4	18.7	20.7	13.7
Richmond, Va.	13.7	5	18.7	20.7	12.7
Wilmington, N. C.	13.4	5	18.4	20.4	12.4
Brunswick, Ga.	15	6	21	23	**15
Jacksonville, Fla.	15	6	21	23	14

Note: 2c per gal. discount off t.w. price of gasoline on sales to dealers; discount to commercial accounts under contract for one year in accordance with Code of Ethics.

*4-cent state tax is collected by retail dealer and paid by him directly to state.

**Georgia kerosene prices include 1c state tax.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M.&P. Naphtha	Cleaner Naphtha
Chicago	14.7	16.7	17
Detroit	17.4	18.9	20.7
Kansas City	†15.9	†17.4	†19.2
Milwaukee	16.4	*19.9	*21.7
Minneapolis	**20.7	**22.2	**24
St. Louis	15.6	17.1	18.9
New York		16	23
Boston		19	23

*Includes 2c state tax. †Includes 1c city tax.
**Includes 3c state tax.

Petroleum Spirits (Solvent)

Tank Cars (F.o.b. refinery or seaboard terminal)	
New York harbor	11.00
Philadelphia district	11.00
Providence	11.50
Tank Wagon or Steel Barrels	
New York City	18
Syracuse	17–18
Rochester	18
Buffalo	17–18
Providence	19
Boston	19
Bridgeport	16–18
Newark	18
Philadelphia	16
Baltimore	18

Note: 2c off above t.w. prices to large buyers in some instances.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

ONTARIO	Gasoline T.W.	Tax	Gasoline Total T.W.	S.S.	Oil T.W.
Toronto	19.5	5	24.5	28	20.5
Ottawa	19.5	5	24.5	28	20.5
North Bay	22.5	5	27.5	33	27
Ft. William	22.5	5	27.5	31	22.5
Border Cities, including Windsor	18.5	5	23.5	27	19.5
MANITOBA					
Winnipeg	21.5	5	26.5	30	21.5
SASKATCHEWAN					
Regina	26	5	31	35	26
ALBERTA					
Edmonton	27.5	5	32.5	36	27.5
Calgary	23.5	5	28.5	32	23.5
BRITISH COLUMBIA					
Vancouver	23	5	28	32	24
QUEBEC					
Montreal	20.5	5	25.5	29	21.5
Quebec City	21.5	5	26.5	30	22.5
Three Rivers	21.5	5	26.5	30	22.5
NEW BRUNSWICK					
St. John	20	5	25	29	22
Moncton	20	5	25	29	22
NOVA SCOTIA					
Halifax	20	5	25	29	22
PRINCE EDWARD ISLAND					
Charlottetown	20	5	25	29	22

Note: In districts surrounding these points 1c additional is added to city price.

Aviation Gasoline Prices

Following are tank wagon prices of aviation gasoline in principal marketing territories and showing state and municipal taxes:

S. O. NEW JERSEY

Prices in Effect May 19, 1930

	T.W.	Tax	Total
Newark, N. J.	15.4	2	17.4
Baltimore, Md.	12.5	4	16.5
Washington, D. C.	15.5	2	17.5

S. O. OHIO

Thru Ohio	17	4	21

Discounts given by S. O. Ohio: For airport delivery only: 2,000 gals. or over per month, 1c per gal.; 6,000 gals. or over per month, 2c; 12,000 gals. and over per month, 3c.

S. O. INDIANA

Chicago	17	3	20
Indianapolis, Ind.	17.2	4	21.2
Detroit, Mich.	17.8	3	20.8
Milwaukee, Wis.	17.1	2	19.1
Minneapolis, Minn.	18.2	3	21.2
St. Louis, Mo.	16.4	2½	18.9
Kansas City, Mo.	16.9	3	19.9
Fargo, N. D.	19.9	3	22.9
Huron, S. D.	18.3	4	22.3
Wichita, Kan.	15.8	3	18.8

In S. O. Indiana territory, buyer pays state and city taxes on aviation gasoline, and if he can get a refund from the state, he does so. St. Louis tax of 2½c includes ½c city tax and Kansas City tax includes 1c city tax.

S. O. LOUISIANA

New Orleans, La.	16	5	21
Nashville, Tenn.	18	5	23
Memphis, Tenn.	17	5	22

2c per gal. discount off above t.w. prices to dealers and commercial consumers.

S. O. NEBRASKA

Omaha	18.25	4	22.25

2c per gal. refund to resellers.

CONTINENTAL OIL CO.

*Denver, Col.	16	4	20
Cheyenne, Wyo.	19.5	4	23.5
Helena, Mont.	25.5	5	30.5
Salt Lake City, Utah	19.5	3.5	23
†Albuquerque, N. M.	19	5	24
Boise, Ida.	22	5	27

*1c per gal. discount to dealers at Denver. †2c per gal. discount to dealers at Albuquerque.

S. O. CALIFORNIA

Phoenix, Ariz.	17	4	21
Los Angeles, Cal.	19.5	3	22.5
San Francisco, Cal.	20	3	23
Reno, Nev.	24	4	28
Portland, Ore.	19.5	4	23.5
Seattle, Wash.	19.5	3	22.5
Spokane, Wash.	23.5	3	26.5

4c per gal. discount off t.w. price of gasoline to customers taking tank truck delivery, through S. O. California territory, except 1c discount at Phoenix.

I.O.M.A. to Mark Roads In Iowa, Kentucky

CHICAGO, May 17.—Meetings have been held in Iowa and Kentucky by the Independent Oil Men of America to arrange for Red Hat roadside signs, according to a recent I.O.M.A. bulletin. Fifteen members were present at Henderson, Ky., April 23, at the call of Col. E. H. Hilpp, president of I.O.M.A., on invitation of G. D. Givens of the Home Oil & Gas Co. of Henderson. Several hundred miles of highway was apportioned among the members for erecting signs.

The Iowa meeting was called by A. L. Lommel, Barttes-Shepard Oil Co., Waterloo, vice-president of I.O.M.A., April 25 at Waterloo. Arrangements were made for signs on U. S. highway 20 across the state from Dubuque to Sioux City.

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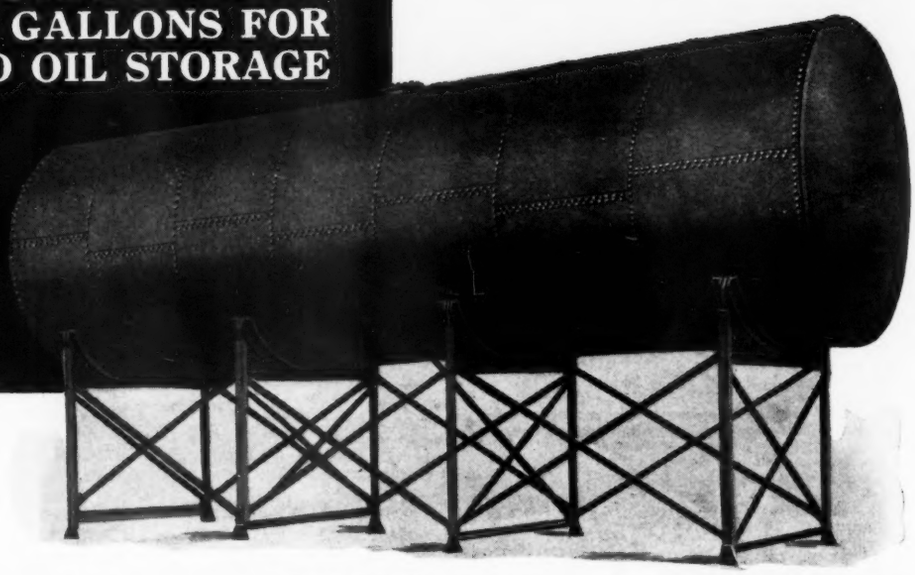

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700 Penton Bldg.
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Crude Oil Prices (in Effect May 19, 1930)

(Crude prices for the whole year in OIL PRICE HANDBOOK published annually)

EASTERN FIELDS

(Posted by Joseph Seep Purchasing Agency)

(All Penna. Grade Crude Effective May 16, 1930)

Bradford—Allegheny district (posted by Tide Water Pipe Co., Ltd.)	$2.50
Penna. Grade Oil in National Transit Lines (Other Pennsylvania)	*2.30
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)	2.25
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)	2.15
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)	1.95
Wayne district crude in Cumberland lines (West Virginia) (Effective Apr. 11, 1930)	1.34
Corning Grade in Buckeye Pipe Lines (Ohio) (Effective May 2, 1930)	1.75
Somerset Oil in Cumberland Pipe Lines (Kentucky) (Effective Apr. 11, 1930)	1.47
Somerset Oil in Eureka Pipe Lines (Effective Apr. 11, 1930)	1.31
Ragland Grade in Cumberland Pipe Lines (Kentucky) (Effective Jan. 29, 1929)	$0.60

*Oil run prior to July 1, 1929 is $2.25 per bbl.

(Posted by Stoll Oil Refining Co.)

Oil City, Ky., oil in Stoll lines (Effective Apr. 18, 1930)	$1.55

MICHIGAN

(Posted by Dixie Oil Co.)

Traverse and Dundee (Muskegon), effective April 16, 1930, same gravity and price schedule as Prairie posts in Oklahoma and Kansas, which see below.

(Posted by Pure Oil Co.)

Midland, Midland County (April 29, 1930)	$1.35

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

Effective Apr. 11, 1930

Wooster	$1.80	Princeton	$1.65
Lima	1.70	Illinois	1.65
Waterloo	1.20	Plymouth	1.23
Indiana	1.47	West Kentucky	1.55

CANADIAN CRUDE

Posted by Imperial Oil Refineries, Ltd.

Petrolia	$2.10
Oil Springs	2.17

OKLAHOMA, KANSAS and NORTH TEXAS

Prices of Prairie Oil & Gas Co.

(In Oklahoma and Kansas)

Effective Apr. 10, 1930

Below 25	$0.75	35-35.9	$1.255
25-25.9	0.80	36-36.9	1.29
26-26.9	0.85	37-37.9	1.325
27-27.9	0.90	38-38.9	1.36
28-28.9	0.95	39-39.9	1.395
29-29.9	1.00	40-40.9	1.43
30-30.9	1.05	41-41.9	1.465
31-31.9	1.10	42-42.9	1.50
32-32.9	1.15	43-43.9	1.535
33-33.9	1.185	44 and above	1.57
34-34.9	1.22		

(In North Texas: Ranger, Wichita Falls, Mexia)

Effective Apr. 10, 1930

Below 25	$0.72	30-30.9	$1.02
25-25.9	0.77	31-31.9	1.07
26-26.9	0.82	32-32.9	1.12
27-27.9	0.87	33-33.9	1.17
28-28.9	0.92	34-34.9	1.22
29-29.9	0.97	35-35.9	1.255
36-36.9	$1.29	41-41.9	$1.465
37-37.9	1.325	42-42.9	1.50
38-38.9	1.36	43-43.9	1.535
39-39.9	1.395	44 and above	1.57
40-40.9	1.43		

The Texas Co., same schedule in Oklahoma as Prairie in Oklahoma; and in North Texas, North Central Texas and Central Texas as Prairie and Humble in North Texas, effective Apr. 10.

Humble Oil & Refining Co. Prices

(Ranger, North Texas, Mexia, Powell, Boggy Creek, Richland, Wortham, Lytton Springs, Currie, Moran and Nocona crudes all in Texas.)

Humble's prices in above fields same as Prairie's prices in North Texas, effective Apr. 10, which see.

Magnolia Petroleum Co.

(In Oklahoma, Kansas and North and East Central Texas)

Below 26	$0.70	28-28.9	$0.88
26-26.9	0.76	29-29.9	0.95
27-27.9	0.82	30-30.9	1.02

Rest of Magnolia schedule up to 44 and above same as Prairie in Oklahoma and Kansas.

Apr. 10, 1930, Glasscock, Crane, Upton, Winkler, Howard and Mitchell Counties same prices as Humble's postings in Winkler, Crane, etc., which see

Corsicana heavy	$0.80
Luling	0.85
Mirando	0.85
Darst Creek, 60° F. gravity	1.15

Carter Oil Co.

(Oklahoma and Kansas)

Apr. 10, 1930, same schedule as Prairie, which see.

PANHANDLE TEXAS

Humble Oil & Refining Co.

Effective Apr. 10, 1930

Hutchinson and Carson Counties:

Below 32	$0.775	38-38.9	$1.065
32-32.9	0.825	39-39.9	1.10
33-33.9	0.875	40-40.9	1.135
34-34.9	0.925	41-41.9	1.17
35-35.9	0.96	42-42.9	1.205
36-36.9	0.995	43-43.9	1.24
37-37.9	1.03	44 and above	1.275

Gray County:

Below 29	$0.755	37-37.9	$1.16
29-29.9	0.805	38-38.9	1.195
30-30.9	0.855	39-39.9	1.23
31-31.9	0.905	40-40.9	1.265
32-32.9	0.955	41-41.9	1.30
33-33.9	1.005	42-42.9	1.335
34-34.9	1.055	43-43.9	1.37
35-35.9	1.09	44 and above	1.405
36-36.9	1.125		

Wheeler County: Posted by Magnolia Pet. Co. Humble withdrew Wheeler county postings Apr. 10.

Below 30	$0.755	37-37.9	$1.11
30-30.9	0.805	38-38.9	1.145
31-31.9	0.855	39-39.9	1.18
32-32.9	0.905	40-40.9	1.215
33-33.9	0.955	41-41.9	1.25
34-34.9	1.005	42-42.9	1.285
35-35.9	1.04	43-43.9	1.32
36-36.9	1.075	44 and above	1.355

Above prices met by The Texas Co. and Magnolia on Apr. 10.

WEST TEXAS AND NEW MEXICO

Humble Oil & Refining Co.

Effective Apr. 10, 1930

Winkler, Crane, Upton, Crockett, Ector, and Pecos Counties, also Lea County, N. Mex.

Below 25	$0.65	31-31.9	$0.86
25-25.9	0.68	32-32.9	0.89
26-26.9	0.71	33-33.9	0.92
27-27.9	0.74	34-34.9	0.95
28-28.9	0.77	35-35.9	0.98
29-29.9	0.80	36 and above	1.01
30-30.9	0.83		

Howard and Glasscock counties:

Effective Apr. 10, 1930

Below 25	$0.65	31-31.9	$0.82
25-25.9	0.68	32-32.9	0.84
26-26.9	0.71	33-33.9	0.86
27-27.9	0.74	34-34.9	0.88
28-28.9	0.76	35-35.9	0.90
29-29.9	0.78	36 and above	0.92
30-30.9	0.80		

Apr. 10, 1930, The Texas Co. posted same prices in Crane, Upton, Winkler and Lea counties as Humble.

SOUTH AND SOUTHWEST TEXAS

(Posted by Humble Oil & Refining Co.)

Effective Apr. 10, 1930

Mirando	$0.85
Salt Flat	1.15
Darst Creek	1.15
Pettus, Bee County	1.40

NORTH LOUISIANA—ARKANSAS FIELDS

Prices of Standard Oil Co. of Louisiana

Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton, De Soto, and Sabine.

Effective Apr. 11, 1930

Below 28	$0.87	36-36.9	$1.29
28-28.9	0.92	37-37.9	1.325
29-29.9	0.97	38-38.9	1.36
30-30.9	1.02	39-39.9	1.395
31-31.9	1.07	40-40.9	1.43
32-32.9	1.12	41-41.9	1.465
33-33.9	1.17	42-42.9	1.50
34-34.9	1.22	43-43.9	1.535
35-35.9	1.255	44 and above	1.57

Cotton Valley, Sarepta and Carterville below 36 $0.85. Rest of schedule same as Caddo, Homer, etc.

Smackover, below 24	$0.90		
do 24 and above	1.05		
Bellevue (Apr. 11, 1930)	1.15		
*Urania, La. (Apr. 11, 1930)	0.95		
†East El Dorado (Calion) (Apr. 11, 1930)	0.90		

*Posted by Louisiana Oil Refining Corp.

†Posted by Magnolia Petroleum Co.

Apr. 10, 1930, The Texas Co. same schedule in Louisiana as Standard, plus these grades: 24-24.9, $0.67; 25-25.9, $0.72; 26-26.9, $0.77; 27-27.9, $0.82.

Apr. 11, Magnolia met Standard schedule in Louisiana-Arkansas fields.

STEPHENS, ARKANSAS

Lousiana Oil Refining Corp., and Atlantic Oil Producing Co.

Effective Apr. 11, 1930

Below 28	$0.76	30-30.9	$0.91
28-28.9	0.81	31-31.9	0.96
29-29.9	0.86	32 and above	1.01

GULF COASTAL

Posted by Humble Oil & Refining Co.

Effective Apr 10, 1930

Grades A	$1.15	34-34.9	$1.30
Grades B:		35-35.9	1.33
Below 25	1.00	36-36.9	1.36
25-25.9	1.03	37-37.9	1.39
26-26.9	1.06	38-38.9	1.42
27-27.9	1.09	39-39.9	1.44
28-28.9	1.12	40-40.9	1.46
29-29.9	1.15	41-41.9	1.48
30-30.9	1.18	42-42.9	1.50
31-31.9	1.21	43-43.9	1.52
32-32.9	1.24	44 and above	1.54
33-33.9	1.27		

Refugio county (rest of schedule, same as Grades B, which see above).

Below 25	$0.85
25-25.9	1.03

Fields classified as A and B are Spindletop, Goose Creek, Hull, Liberty, Sour Lake, West Columbia, Orange, Boling, Humble, Pierce Junction, Sugarland and Raccoon Bend. All other fields are Grades A only.

Specifications for Grade "A" crude: Gravity: 25° and below, at 60° F; Viscosity: not less than 100 seconds at 100° F Saybolt.

Sulfur: not over .4%.

Grade "B" includes all Coastal crude which does not meet the test for "A" grades.

Crude Price Changes

OIL CITY, Pa.—On May 16 Joseph Seep Purchasing Agency reduced prices of all Pennsylvania grade crude 25 cents per barrel, and discontinued postings on Bradford district oil in New York and National Transit lines, but it will pay $2.50 per barrel for balances left in those lines.

Somerset, Wayne district, Corning and Ragland were unchanged. The last previous change on Pennsylvania crude was a 25 cent cut on May 1.

New prices are: Pennsylvania grade oil in National Transit lines, run July 1, 1929, and after, $2.30; run prior to July 1, $2.25; in Southwest Pennsylvania lines, $2.25; in Eureka lines, $2.15; in Buckeye lines, $1.95 per barrel.

SAN FRANCISCO—On May 17 Standard Oil Co. of California reduced prices of light crude oils in Santa Fe Springs in amounts ranging from 75 cents to 90 cents per barrel. The reduction began on 21 gravity crude, which is 50 cents per barrel, this price applying on grades up to and including 27.9 gravity. Next grade of 28-28.9 gravity is 56 cents, and maximum grade of 35 and above is 95 cents. For new prices see crude oil price table in this issue.

To Promote Coal Heat

WASHINGTON, May 19.—To combat the growing use of natural gas and oil for heating the National Coal Association and the manufacturers of coal burning equipment are forming a co-operative body. The new group is to seek to show consumers how cheaply and well heating can be done with coal in modern installations with automatic stokers and good combustion.

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"MATHEMATICS for Engineers" by Raymond W. Dull, research engineer of the Link-Belt Co., Chicago, is a practical treatise on mathematics for (1) engineers who want a quick and convenient reference; (2) engineers who have grown somewhat rusty in their mathematics; (3) engineers who feel the need of a text for the study of mathematics.

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Crude Oil Prices (in Effect May 19, 1930)

(Prices are per barrel at the well)

(Crude Oil Prices for the whole year in OIL PRICE HANDBOOK published annually)

GULF COASTAL

Prices of The Texas Co.

Effective Apr. 10, 1930

Grades A.....$1.15 *Grades B.....$1.00

*Grades B include all heavy crudes which do not meet tests for Grades A or for Grades B light crude. Prices for Grades B light crude are the same as Humble's, which see.

ROCKY MOUNTAIN FIELDS

Prices of Ohio Oil Co., and Midwest Refining Co.

(Salt Creek prices effective Apr. 10, 1930)

‡Salt Creek 29–29.9	$1.00
" " 30–30.9	1.05
" " 31–31.9	1.10
" " 32–32.9	1.15
" " 33–33.9	1.185
" " 34–34.9	1.22
" " 35–35.9	1.255
" " 36–36.9	1.29
" " 37 and above	1.325
Elk Basin	1.55
Grass Creek light	$1.55
Big Muddy	1.38
Lance Creek	1.63
Rock Creek	1.35
Mule Creek	1.20
Rex Lake	1.10
‡Osage	1.63
‡Cat Creek, Mont.	1.55
Sunburst, Mont.	1.65
‡Hogback, N. Mex.	1.40
Artesia, N. Mex.	1.05

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light and Elk Basin.

CALIFORNIA

Standard Oil Co. of California

(Effective March 11, 1930)

Gravity	Signal Hill Seal Beach Alamitos Heights Huntington Beach Inglewood* Olinda-Brea Canon*	Athens Rosecrans Dominguez	Elwood Terrace	Torrance Richfield	Whittier La Habra	Montebello	Coyote	Santa Fe Springs	Newhall McKittrick Kern River	Midway-Sunset Elk Hills Buena Vista Hills Lost Hills	Coalinga	Wheeler Ridge	Kettleman Hills	Orcutt (Santa Maria) (Union Oil Co.)	Santa Paula (Ventura) (Union Oil Co.)	Ventura Avenue (Associated Oil Co.
14–14.9**	$0.70	....	....	$0.70	$0.70	$0.70	$0.70	....	$0.55	$0.55	$0.55	$0.55	....	$0.55	$0.70	$0.70
15–15.9	.70	....	....	.70	.70	.70	.70	....	.55	.55	.55	.55	....	.55	.70	.70
16–16.9	.70	....	....	.70	.70	.70	.70	....	.55	.55	.55	.55	$1.65	.55	.70	.70
17–17.9	.70	....	....	.70	.70	.70	.70	....	.55	.55	.55	.55	for	.55	.70	.70
18–18.9	.76	....	....	.76	.76	.71	.76	....	.55	.62	.62	.62	55°	.65	.75	.76
19–19.9	.82	....	....	.82	.82	.77	.82	....	.55	.70	.70	.70	gravity	.70	.80	.82
20–20.9	.88	....	....	.88	.87	.83	.87	....	....	.78	.78	.78	and	.78	.85	.88
21–21.9	.94	....	F. o. b. ship	.94	.93	.90	.93	$0.50	....	.86	.86	.86	over	.90	.90	.91
22–22.9	1.00	....	....	1.00	.98	.97	.98	.50	....	.94	.94	.94	....	.95	.97	.94
23–23.9	1.07	....	....	1.07	....	1.05	1.04	.50	....	1.02	1.02	1.02	....	1.02	1.05	1.00
24–24.9	1.14	1.14	....	1.14	....	1.11	1.10	.50	....	1.09	1.07	1.07	....	1.10	1.08	1.07
25–25.9	1.21	1.19	....	1.21	....	1.17	1.16	.50	....	1.16	1.12	1.12	....	1.18	1.13	1.14
26–26.9	1.28	1.24	....	1.28	....	1.23	1.23	.50	....	1.23	1.17	1.17	....	1.26	1.18	1.21
27–27.9	1.35	1.29	....	1.35	....	1.29	1.30	.50	....	1.30	1.23	1.22	....	....	1.23	1.28
28–28.9	1.42	1.34	....	1.42	....	1.35	1.37	.56	....	1.35	1.27	....	....	....	1.28	1.35
29–29.9	1.46	1.39	....	†1.46	....	1.38	1.41	.62	....	1.41	1.31	....	....	....	1.33	1.39
30–30.9	1.50	1.45	....	†1.50	....	1.41	1.45	.68	....	1.47	1.35	....	....	....	1.39	1.43
31–31.9	1.55	1.51	....	....	....	....	....	.74	....	1.53	1.39	....	....	....	1.45	1.48
32–32.9	1.60	1.57	....	....	....	....	....	.80	....	1.59	1.43	....	....	....	1.51	1.53
33–33.9	....	1.64	....	....	....	....	....	.85	....	1.65	1.47	....	....	....	1.58	1.59
34–34.9	....	1.71	1.32	....	....	....	....	.90	....	††1.71	1.51	....	....	....	....	1.65
35–35.9	....	1.78	1.39	....	....	....	....	.95	....	††1.77	1.55	....	....	....	....	1.71
36–36.9	....	1.84	1.46	....	....	....	....	....	....	....	....	....	....	....	....	....
37–37.9	....	1.90	1.53	....	....	....	....	....	....	....	....	....	....	....	....	....
38–38.9	....	1.96	1.60	....	....	....	....	....	....	....	....	....	....	....	....	....
39–39.9	....	2.02	1.66	....	....	....	....	....	....	....	....	....	....	....	....	....
40–40.9	....	2.08	1.72	....	....	....	....	....	....	....	....	....	....	....	....	....
41–41.9	....	2.14	1.78	....	....	....	....	....	....	....	....	....	....	....	....	....
42–42.9	....	2.20	1.84	....	....	....	....	....	....	....	....	....	....	....	....	....

*Inglewood prices run only to 28.9 gravity; Olinda-Brea Canon to 31.9 gravity.
†Richfield crude only. ††These two grades apply on Lost Hills only.
**Standard does not contract for crude testing below 14 gravity, but pays 45c per barrel when purchased

REFINERS' and COMPOUNDERS' SUPPLIES

Following are average market prices for materials used by refiners and compounders effective on the date shown.

Refiners' Supplies

	May 19	May 12
Soda Ash light 58% bags, cwt.	$1.32	$1.32
Silicate of Soda 60 deg. drums, cwt.	$1.55	$1.55
Silicate of Soda 40 deg. tank cars, cwt.	$0.60	$0.60
Silicate of Soda 40 deg. drums cwt.	$0.80	$0.80
Sal Soda wks.	$1.00–1.05	$1.00–1.05
Caustic Soda 76% solid, cwt.	$2.90	$2.90
Sulfuric Acid 60 deg. tank cars, f.o.b. shipping point per ton	$11.00	$11.00
Oleum 20%, fuming sulfuric, tank cars, wks.	$18.50	$18.50
Sulfur, flowers of cwt.	$3.10–4.00	$3.10–4.00
Liquid Chlorine, tank cars, wks. lb.	3.50–5.00	3.50–5.00

Compounders' Supplies

	May 19	May 12
Vegetable Oils		
Linseed carloads, spot lb.	14.20	14.20
Tanks, spot	13.40	13.40
Soya Bean, Tank, coast, lb.	9.50	9.50
Oleic Acid		
Distilled, tanks lb.	9.25–9.50	9.25–9.50
Distilled, bbls. lb.	10.125-10.375	10.125-10.375
Saponified, tanks lb.	9.25	9.25
Saponified, bbls. lb.	10.125–10.625	10.125-10.625
Lard Oils		
Prime Winter Strained lb.	13.25	13.25
Extra Winter Strained lb.	11.75	11.75
Extra lb.	11.50	11.50
Extra No. 1 lb.	11.00	11.00
No. 1 lb.	10.50	10.50
No. 2 lb.	10.25	10.25
Tallow oil lb.	10.00	10.00
Neatsfoot Oil		
Pure, bbls. lb.	13.00	13.00
Extra, bbls. lb.	11.25	11.25
No. 1 bbls. lb.	11.00	11.00
Cold Pressed lb.	17.50	17.50
Fish Oils		
Menhaden Oil		
Light Pressed gal.	63–65	63–65
Light Pressed, tank cars, N. Y. gal.	53	53
White bleached gal.	67	67
Yellow bleached gal.	61	61
Whale, extra winter bleached, gal.	85	85
Naval Stores		
Steam, distilled turpentine, N. Y. gal.	42	42
Steam distilled turpentine, Savannah gal.	38	38
Gum turpentine, N. Y. gal.	50	50
Gum turpentine, f.o.b. cars Savannah gal.	44	44
Wood Rosin, N.Y. gal.	$6.46	$6.25
Wood Rosin F, Savn'h bbl.	$5.70	$5.50
Gum Rosin B, N. Y. bbl.	$6.50	$6.35
Gum Rosin B, f.o.b. cars Savannah bbl.	$5.25	$5.65
Rosin oil, pure gal.	57	57
Rosin oil, compounded gal.	50	50
Pine Tar		
Kiln burnt bbl.	$13.00–14.00	$13.00–14.00
Retort bbl.	$13.50–14.50	$13.50–14.50
Alcohol		
Denatured Formula 5, in bbls., per gal.	50–54	50–54

OIL STOCKS AND FINANCES

National Petroleum News

American Republic Gets Galena Oil Stock

NEW YORK, May 17.—Stock of the Rockefeller Foundation and certain other interests in the Galena Oil Corp. have been acquired by the American Republics Corp. in exchange for stock in The Interstate Natural Gas Co.

The Dec. 31, 1928, report of the Foundation showed it to hold 4193 shares of preferred stock and 20,000 shares of common stock of the Galena Signal Oil Co. whose name, on reorganization, was changed to Galena Signal Oil Corp.

The stock of the Galena Signal Oil Co. was exchanged into stock of the reorganized company on a basis of two shares of new common for each share of preferred and share for share on the common. The preferred also received $75 cash in the exchange.

This means the American Republics Corp. got 28,386 Galena shares from the Foundation if no stock was disposed of since the Foundation's 1928 report. Identity of the other sources was not announced.

Continental Reported Planning Expansion

NEW YORK, May 17.—Election of George Whitney, J. P. Morgan & Co., to the chairmanship of the Continental Oil Co. executive committee led New York this week to believe Continental plans extensive developments. Developments include extensions in Continental's eastern marketing facilities, it is said.

Mr. Whitney succeeded S. H. Keoughan who resigned as chairman and also as a director. E. T. Wilson, chairman of the board, who was head of the old Continental Oil Co. which was merged last year with Marland Oil Co., Vernon F. Taylor, Albert Brunker and Fred Searles also resigned as directors. Franz Schneider, Jr., Newmont Mining Co., was the only new director elected at the annual meeting in Wilmington, Del. Size of the board was reduced from 16 to 11 members.

With Mr. Whitney on the executive committee are William C. Potter, Arthur B. Lawrence, and D. J. Moran, president of the company. Management of the company is now in the hands of the J. P. Morgan & Co. men who assumed charge of Marland Oil Co. affairs after E. W. Marland retired.

Mr. Wilson was one of the old Standard Oil men in the saddle of the former Standard Oil Co. of New Jersey's Rocky Mountain subsidiary. Mr. Keoughan became an officer of Continental when that company and the Mutual Oil Co., a Rocky Mountain producing and refining company, were consolidated several years ago. The Mutual was a consolidation of the Elk Basin Consolidated and other Rocky Mountain producing enterprises.

Phillips Forms Two Gas Subsidiaries

CLEVELAND, May 19.—Phillips Petroleum Co. has organized two new subsidiaries capitalized at 100,000 no par shares each.

One is the Phillips Natural Gas Co. which will be the vehicle for broadening the Phillips' markets for its natural gas, and other activities in the natural gas field.

The Phillips Petroleum Utilities Co. primarily will distribute Phillips liquefied petroleum gas. It also will cooperate with the parent company in its utilities division.

A week ago Frank Phillips, president, announced formation of the Phillips Pipeline Co. to build an 8000 to 1000-mile gas line from the Texas Panhandle through Kansas eastward at a cost of $12,000,000 to $15,000,000.

Superior Issues More Stock

NEW YORK, May 17.—Half of the issue of 250,000 no par shares recently listed on the New York Stock Exchange by Superior Oil Corp. has been underwritten at $8 a share and an option has been taken on the other half at the same price, it is announced. The option must be exercised within 90 days from April 29. Proceeds from the sales are to be used to pay certain indebtedness and to provide more working capital.

NEW YORK, May 17.—Cities Service Co. has bought the marketing facilities of the Tydol Oil in Binghamton, N. Y.

Darby Plans to Cut Number of Shares

CLEVELAND, May 19.—Special meeting of stockholders of Darby Petroleum Corp. will be held in Wilmington, Del., May 26 to vote on a proposal to reduce the number of authorized no par capital shares from 1,250,000 to 750,000 shares. It is planned to issue one share of new stock for each two outstanding shares of present no par stock.

The company has outstanding 1,019,392 shares of stock. This amount calls for the issue of 509,696 shares of new stock when the plan is authorized.

Darby Petroleum in 1929 netted $1,155,582 which was $1.13 a share on the 1,019,392 outstanding shares. In 1928 the company netted $893,558 or $2.07 a share on the 388,073 shares then outstanding.

Darby acquired the Tidal-Osage Oil Co. May 14, 1929, through an exchange of 631,319 shares of its stock for the Tidal-Osage stock share for share. The net of the consolidated company the last seven months of 1929 was $1.68 a share on the 1,019,392 shares, J. F. Darby, president, informed stockholders.

Paragon Considers Sale or Merger

CLEVELAND, May 19.—Directors of Paragon Refining Co., who are considering several proposals of sale and merger, recessed at their meeting May 16 in Cincinnati without taking action that could be announced, it was said. The next meeting is subject to the call of the president, E. W. Edwards.

The names of the interests that are negotiating for the Paragon and its subsidiary, the Valvoline Oil Co., were not revealed.

At the annual meeting of stockholders May 13 all directors were reelected.

Tax Applies on Diesel Fuel

CLEVELAND, May 19.—The attorney general of the state of Washington has ruled that gasoline tax should be collected on Diesel fuel used in airplane motors or on public roads. If used in airplanes a refund can be obtained. The Washington tax is on "liquid fuels."

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Transactions in Oil Shares on New York Stock Exchange

1929 High	1929 Low	1930 High	1930 Low	Listed Shares	Par Value	Company	Div. Rate	Last Paid	Transactions Week Ended May 17 Sales	First	High	Low	Last	Change
42⅝	17½	42¼	20½	922,075	N.P.	Amerada Corp.	50cQ	Apr. 30, 30	4,800	25½	25½	24½	24½	— 1
64¾	12½	37	20½	209,180	N.P.	American Republics Corp.	....	.....	5,900	26	27⅜	24⅛	24⅛	— 1¾
47¼	34½	50¼	32½	2,240,000	$25	Associated Oil	50cQ	Mar. 31, 30	120	..	47½	45	47½	— 1
77⅞	30	51⅜	36¼	2,683,868	25	Atlantic Refining Co.	‡25cQ	Mar. 15, 30	18,900	43	43¾	42¼	43⅛	+ ⅛
49⅛	20	34	20½	2,257,108	25	Barnsdall Corp. A	50cQ	May 7, 30	28,400	27	28⅜	26⅝	26⅝	— ⅛
34½	25	29⅝	28	2,060,966	25	California Petroleum Corp.	....	Jan. 1, 29	.....	.....	.....	.....	.....	.....
32⅞	12½	20⅝	13	1,444,970	N.P.	Colonial Beacon Oil Co.	....	.....	1,400	17½	18½	17½	17½	+ ½
37¾	18	30½	19⅛	4,610,258	N.P.	Continental Oil (Delaware)	....	.....	58,100	26¼	28¼	25½	27½	+ 1¼
94¾	42¼	71⅛	49⅜	410,857	$100	General Asphalt Co.	$1Q	Mar. 15, 30	13,600	56⅜	60¼	56⅛	58	+ 1⅝
109	26	116⅞	52¼	250,000	100	Houston Oil	....	.....	72,300	97⅞	105½	96⅝	102¾	+ 5¼
39⅜	17¾	32	20¼	1,379,295	N.P.	Independent Oil & Gas	50cQ	Apr. 30, 30	9,800	26⅛	26⅜	24¼	24½	— 1⅜
53	13⅛	28⅜	16	699,066	10	Indian Refining	....	Dec. 15, 20	36,300	19⅜	20½	19⅛	19⅛	— ⅜
51¼	11½	27¾	15½	568,816	10	do certificates	....	.....	11,400	18⅛	19⅜	18	18½	+ ⅛
38⅜	16½	26½	21¼	3,994,150	N.P.	Lago Oil & Transport	....	Aug. 2, 27	900	24½	26½	24½	25½	+ 1¼
18	7	12	8	1,187,701	N.P.	Louisiana Oil Refining	....	.....	8,900	9¾	10⅛	9⅝	10	0
100¼	80	89½	84	40,000	$100	do pfd.	$1.62½Q	May 15, 30	.....	.....	.....	.....	.....	.....
18½	5⅞	10⅜	5⅛	330,000	N.P.	Maracaibo Oil Exploration	....	.....	500	7½	8⅛	7½	8⅛	+ 2⅛
295	176	179	176	459,428	$100	Mexican Petroleum	$3Q	Apr. 21, 30	.....	.....	.....	.....	.....	.....
105	102	....	....	120,000	100	do pfd.	$2Q	Apr. 21, 30	.....	.....	.....	.....	.....	.....
69⅜	9¼	37	16⅛	1,244,383	N.P.	Mexican Seaboard Oil	....	Oct. 15, 24	71,400	28	29½	27⅛	28¼	+ ¾
39⅞	22⅛	33	23½	1,899,138	N.P.	Mid-Continent Petroleum	50cQ	May 15, 30	21,500	28⅞	28⅞	27⅞	28	— ½
3⅝	¾	2½	⅞	908,171	N.P.	Middle States Oil ctfs.	....	.....	4,100	..	1⅝	1½	1½	— ⅛
69	40¼	64¼	51⅝	1,000,000	$50	Pan American Petrol. & Trans.	....	Oct. 20, 27	5,200	59⅞	*64¼	59⅞	62½	+ 5⅜
69¼	40½	67½	50½	2,422,221	50	do B	....	Oct. 20, 27	54,200	61⅜	*67½	61⅜	65¼	+ 4¼
15¼	3	12¾	4⅛	199,370	N.P.	Panhandle Prod. & Refg.	....	.....	32,400	10⅞	*12¾	10½	11½	+ 1
76	47½	80	47½	25,666	$100	do pfd.	....	July 2, 23	1,100	80	*80	80	80	+ 5
47	24¼	44¾	29⅛	2,670,089	N.P.	Phillips Petroleum Co.	50cQ	Apr. 1, 30	67,500	40⅞	42¼	38½	37¾	— ¼
3⅜	1	2½	1	1,184,917	$25	Pierce Oil Corp.	....	.....	11,500	2¼	2¼	1⅞	1⅞	— ⅜
51½	20	52	20½	150,000	100	do pfd.	....	Feb. 1, 22	2,900	47	49	43¼	45	— 4⅞
5⅞	⅛	7⅛	2¼	2,500,000	N.P.	Pierce Petroleum Corp.	....	.....	76,200	6⅝	6¾	5¾	6⅜	— ¼
65⅝	40½	54	45	2,435,670	$25	Prairie Oil & Gas Co.	50cQ	Mar. 31, 30	4,500	47⅞	48	46	47½	0
65	45	60	50¼	4,050,000	25	Prairie Pipe Line Co.	‡75cQ	Mar. 31, 30	13,600	51⅜	53⅛	51½	52	0
25⅞	4	11⅞	6½	749,017	50	Producers & Refiners Corp.	....	Sept. 15, 30	1,400	8⅞	9	8½	8⅝	+ ¼
46¾	25½	35	35	56,907	50	do pfd.	....	May 4, 25	.....	.....	.....	.....	.....	.....
30¾	20	27¼	21⅜	3,038,370	25	Pure Oil Co.	37½cQ	Mar. 1, 30	9,300	23⅞	24⅜	23¾	23¾	0
116	108	114¼	110½	130,000	100	do 8% pfd.	$2Q	Apr. 1, 30	20	..	112⅝	112½	112⅝	+ ½
49⅜	22⅝	28¼	20⅝	2,101,550	25	Richfield Oil (California)	50cQ	May 15, 30	7,600	23½	24	23¼	23⅛	— ⅜
42½	15	25⅞	16½	1,235,270	N.P.	Rio Grande Oil Co.	50cQ	Apr. 25, 30	6,900	22	22⅜	21¼	21⅞	— ⅛
64	43⅛	56½	49¼	951,310	$13.40	Royal Dutch (N. Y. shares)	$1.3415	Feb. 15, 30	8,000	53⅛	54	52¾	53⅜	+ ⅜
55¾	43⅜	48⅜	42⅜	77,492	£2	Shell Transp. & Trading	97c	Jan. 28, 30	.....	.....	.....	.....	.....	.....
31¾	19	25½	20⅛	13,069,076	N.P.	Shell Union Oil Corp.	35cQ	Mar. 31, 30	21,000	22¾	22¾	21½	22	— ¾
.....	.....	106¼	100	400,000	100	do pfd.	$1.37½Q	Apr. 1, 30	2,500	104⅜	105	102	102	— 2½
40⅛	15	37	22⅞	869,255	10	Simms Petroleum Co.	40cQ	Mar. 15, 30	8,500	29½	30⅞	28½	29⅝	+ 1⅞
45	21	32	21⅝	5,455,665	N.P.	Sinclair Consolidated Oil Corp.	50cQ	Apr. 15, 30	70,300	27⅝	28⅜	27	27⅜	— ⅛
111	103	112¼	109	154,685	100	do pfd.	$2Q	May 15, 30	100	110½	110½	110½	110½	+ ½
46½	42	42	28⅞	1,097,650	$25	Skelly Oil Co.	50cQ	Mar. 15, 30	4,500	35¾	36⅞	35	35	— ½
.....	.....	103½	98	750,000	100	S. O. Export Corp. pfd.	.....	.....	800	103	*103½	102¼	103½	+ ½
81⅞	51½	75	55½	13,016,434	N.P.	S. O. California	62½cQ	Mar. 15, 30	24,800	70¼	72¼	69¾	70	+ ⅛
.....	.....	49	37¼	320,000	$25	S. O. Kansas	50cQ	Mar. 15, 30	9,600	42	43¾	41	41⅞	— 1
83	48	84⅞	58	25,443,643	25	S. O. New Jersey	‡25cQ	Mar. 15, 30	411,000	77½	81⅜	76¼	79	+ 2½
48⅛	31¾	40⅜	31¼	17,809,530	25	S. O. New York	40cQ	Mar. 15, 30	54,000	36⅜	37½	36⅛	36⅝	+ ⅛
86⅜	55	70	53	1,416,911	N.P.	Sun Oil Co.	25cQ	Mar. 15, 30	900	64½	65⅞	64½	65	+ ⅛
105½	100	105⅛	102½	100,000	$100	do pfd.	$1.50Q	Mar. 1, 30	480	..	104½	103½	104½	+ 1⅜
24	5¼	9⅜	5¼	1,026,979	N.P.	Superior Oil Corp.	....	.....	17,100	9¼	*9¾	7¾	7⅞	— 1⅜
71⅞	50	60½	50⅝	9,850,724	$25	The Texas Corp.	75cQ	Apr. 1, 30	37,000	58⅞	59	57⅛	57⅞	0
23⅞	9½	14½	8⅞	929,947	10	Texas Pacific Coal & Oil	s2½%	Dec. 31, 29	5,900	11⅛	11½	10⅜	10⅝	— ⅜
23½	10	17¾	10¾	5,881,980	N.P.	Tide Water Associated Oil	30cS.A.	Feb. 15, 30	46,700	15½	16⅞	15	16⅜	+ 1⅛
90⅞	74⅛	89¾	78	732,550	$100	do pfd.	$1.50Q	Mar. 31, 30	6,000	87⅛	88¾	86½	88	+ 1¾
40	14	31	19½	2,191,820	N.P.	Tide Water Oil Co.	20cQ	Mar. 31, 30	.....	.....	.....	.....	.....	.....
97½	85⅛	94⅞	86⅛	199,443	$100	do pfd.	$1.25Q	May 15, 30	1,100	93⅞	94¼	93⅞	94¼	+ 1¼
.....	.....	24	16¼	3,339,150	N.P.	Transcontinental Oil	30c	May 1, 30	42,700	20⅝	21⅞	20½	20¾	— ⅛
57	42⅛	50	40⅛	2,201,008	$25	Union Oil Co. (California)	‡50cQ	May 10, 30	4,000	45½	46¼	45⅛	45¼	— ¼
.....	.....	38½	32⅛	1,254,048	N.P.	Union Tank Car Co.	40cQ	Mar. 1, 30	400	32⅛	33½	†32⅛	32½	+ ½
42⅞	15	27	16⅝	777,603	N.P.	Warner Quinlan Co.	25cQ	Apr. 3, 30	47,000	19⅛	19⅝	18⅜	18⅞	— ½
38	25	29½	26	490,000	N.P.	White Eagle Oil & Refg.	50cQ	Apr. 20, 30	.....	.....	.....	.....	.....	.....
29¾	12⅞	21	11½	428,967	N.P.	Wilcox Oil & Gas Co.	....	May 10, 28	400	18	18¾	18	18	0

*New high †New low ‡Also extra s-Stock Total sales 1,487,420

Cleveland Stock Market

May 16	Par Value	Bid	Asked
Canfield Oil Co.	$100	..	110
Fred G. Clark	10	5	7
National Refining	25	30½	34
do pfd.	100	132	134
Paragon Refining	..	12½	13½
do certificates	..	..	15
do A pfd.	N.P.	..	49

Financial Notes

Houston Oil Co.—All outstanding 5½ per cent convertible notes due July 1, 1938, have been called for redemption July 15 at 102½.

Louisiana Oil Refining Co.—All directors re-elected at annual meeting.

Pierce Oil Co.—All directors re-elected.

Shell Union Oil Corp.—S. W. Duhig elected secretary and treasurer. Other officers re-elected following annual meeting at which all directors were re-elected.

Income Reports

First Quarter	1930	1929
Amerada Corp.	*$76,585	$50,762
Houston Oil	523,249	345,147
Louisiana Oil Refg.	*63,798	†239,035
Rio Grande Oil	1,204,265	1,263,325
Skelly Oil	547,510	1,170,208
Texas Pacific Coal & Oil	‡374,034	‡428,142

*Loss. †Before federal income taxes. ‡Before depreciation and depletion.

Annual	1929	1928
Darby Petroleum	$1,155,582	$803,558
Mexican Seaboard	*28,850	*1,332,906

*Loss.

Lion Buys Into Marketing Company

EL DORADO, Ark., May 17.—Lion Oil Refining Co. has bought controlling interest in the Pennsylvania Oil Co. of Memphis, Tenn. The Pennsylvania Oil Co. has four bulk stations and 21 service stations in western Tennessee and northeastern Arkansas. The acquisition is expected to provide an outlet for approximately 2,250,000 gallons of Lion products this year.

The United States imported 4,321,000 barrels of crude oil in February, 2,927,665 barrels of which came from South America. Venezuela shipped 1,730,900 barrels, Colombia 937,000 barrels, Peru 212,000 and Ecuador 47,770 barrels.

The Netherland West Indies was the source of 971,350 barrels and Mexico 418,000 barrels. Total value of crude imports was **$4,704,665.**

Pittsburgh Stock Exchange

Transactions week ended May 16, 1930

	Sales	High	Low	Last	Change
Ark. Nat. Gas	330	13½	13	13	— ¼
do pfd.	1,562	8	8	8	0
Devonian Oil	110	11½	11	11	—1
Dixie & Util. pfd.	30	91	90	91	—2
Leonard Oil	950	3	2⅞	3	+ ⅛
Lone Star Gas	10,102	52¼	49	52	+3½
do pfd.	130	108	108	108	—1
Plymouth Oil	135	22¼	21⅝	22	0
Pgh. Oil & Gas	81	3	3	3	0
Phoenix Oil	500	.60	.60	.60	0
Shamrock Oil & Gas	8,075	25	22	25	+3¼
Lone Star rights	6,653	4⅜	4	4¼	+ ⅛

Pittsburgh Curb Market

Transactions week ended May 16, 1930

	Sales	High	Low	Last	Change
Ark. Gas A	30	12⅝	12⅝	12⅝	0

Langmuir to Receive the Willard Gibbs Medal

CLEVELAND, May 16.—Scientists and educators from all over the country will witness the presentation to Dr. Irving Langmuir of the Willard Gibbs Medal of the Chicago Section of the American Chemical Society on May 23.

"What Are Atoms Like—How Do We Know?" will be the subject of Dr. Langmuir's address at the medal ceremony following a dinner at the Palmer House. A reception will precede the dinner.

Dr. W. V. Evans of Northwestern University, Chairman of the Chicago section of the society, will preside, and Dr. Julius Stieglitz of the University of Chicago will present the medal.

Dr. Karl T. Compton, head of the Physics Department of Princeton University, will deliver an address. Others who will speak are President Glenn Frank of the University of Wisconsin, Dean R. E. Herlman of Northwestern University, Dr. Herman Bundesen, Coroner of Cook County, Ill., and Martin Insull of the Midwest Utilities Company, Chicago.

Dr. Langmuir is the nineteenth medalist, who is chosen annually for work in either pure or applied chemistry which has received world wide recognition. Dr. Langmuir's researches have been carried out largely since 1909 in the laboratories of the General Electric Company at Schenectady, N. Y., where he is Associate Director of Research.

William A. Converse of Chicago founded the medal in honor of Josiah Willard Gibbs, who was professor of mathematical physics at Yale from 1871 until his death in 1903. Madame Curie of France, Svante Arrhenius of Sweden and Sir James C. Irvine of Scotland have been European recipients.

American medalists have been T. W. Richards, L. H. Baekeland, Ira Ramsen, Arthur A. Noyes, Willis R. Whitney, E. W. Morley, W. M. Burton, W. A. Noyes, F. G. Cottrell, Julius Stieglitz, G. N. Lewis, Moses Gomberg, J. J. Abel, W. D. Harkins, and Claude S. Hudson.

Files Gas Tax Suit Again

CLEVELAND, May 19.—Standard Oil Co. of Indiana, has refiled its suit to recover gasoline taxes paid in Illinois under the tax law of 1927 which was held invalid. In a former case the state supreme court held that refund could not be made since the company passed the tax on to its customers.

In its new case the Standard shows that it paid under protest $2,370 in taxes on gasoline used in its own vehicles and that many customers paid the tax under protest. The total sum sought is $224,873.

THE OIL INDUSTRY EXCHANGE

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Small second hand wax caking equipment. State price and description first reply.
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DELCO SIXTEEN BATTERY LIGHT AND WATER OUTFIT FOR SALE in excellent condition. Cost $700. Am installing Consumers Power so will take $200 for quick sale. Valley City Oil Company, 508 Grand Rapids Trust Bldg., Grand Rapids, Michigan.

USED SERVICE STATION EQUIPMENT FOR SALE. Air compressor—$60, Air tower $15, Steel drain pit $40, Tokheim 10-gallon visible metered pumps, each $50. Valley City Oil Company, 508 Grand Rapids Trust Bldg., Grand Rapids, Michigan.

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Copy must reach us not later than Friday preceding date of issue.

All advertisements carried on this page are payable in advance.

Standard Oil Stocks on New York Curb

1929 High	1929 Low	1930 High	1930 Low	Outstanding Shares	Par Value	Companies	Div. Rate	Last Paid	Transactions Sales	Week First	Week High	Week Low	Ended Last	May 17 Change
18¾	13½	18¼	12¼	.....	£1	Anglo-Amer. Oil voting stk. ctfs.	36c	June 5, 29	200	18¼	18¼	18¼	18¼	0
17⅛	11	19	12	.....	£1	do non-voting stk. ctfs.	36c	June 5, 29	.....	.....	.....	.....	.....	.....
2½	¾	1	½	500,000	N.P.	Atlantic Lobos Oil	....	.....	300	¾	¾	¾	¾	0
4⅛	1	1½	1¼	200,000	$50	do pfd.	.....	.....	.....	.....	.....	.....	.....	.....
46½	25	25	20	40,000	25	Borne Scrymser Co.	$1S.A.	Apr. 15, 30	.....	.....	.....	.....	.....	.....
74¼	55	69	57	200,000	50	Buckeye Pipe Line Co.	$1Q	Mar. 15, 30	400	58¾	58¾	58¾	58¾	+ 1⅛
210	130	184⅞	155	120,000	25	Chesebrough Mfg. Co.	‡$1Q	Mar. 31, 30	.....	.....	.....	.....	.....	.....
11¾	5⅝	7½	5⅝	.....	N.P.	Creole Petroleum Co.	....	.....	8,400	6⅜	6½	6⅛	6⅛	— ⅛
75¾	40	65¾	40½	30,000	$ 50	Cumberland Pipe Line Co.	$1Q	Mar. 15, 30	350	57	57	55	57	0
70½	42	54¾	43	50,000	100	Eureka Pipe Line Co.	$1Q	May 1, 30	50	46	46	46	46	+ 2
....	....	5½	2½	280,000	N.P.	Galena Oil Corp. w.i.	....	.....	3,800	5½	7	5½	6⅜	+ 1¼
....	....	37¼	32	.....	N.P.	General Petroleum Corp. w.i.	....	.....	.....	.....	.....	.....	.....	.....
128	74½	119	78	2,974,645	$25	Humble Oil & Refg. Co.	50cQ	Apr. 1, 30	14,800	104	108	102	105	+ ⅝
41	22	30	22⅛	26,490,741	N.P.	Imperial Oil, Ltd.	12½cQ	Mar. 1, 30	16,200	25	26⅝	25	25½	+ ⅝
42¼	26	41	37	300,000	$10	Indiana Pipe Line Co.	50cQ	May 15, 30	19,800	38⅜	38⅜	37⅞	37⅞	+ ⅝
29⅜	15	24	17⅞	14,247,880	N.P.	International Petroleum Co.	25c	Mar. 15, 30	2,400	21	21⅞	21	21	0
25⅞	10½	22⅜	18⅜	509,000	$12½	National Transit Co.	25cQ	Mar. 15, 30	4,700	19	19⅜	18⅝	18¾	— ⅛
17¾	10	20½	14	100,000	10	New York Transit Co.	‡40cQ	Apr. 15, 30	.....	.....	.....	.....	.....	.....
63	41	54	37	40,000	50	Northern Pipe Line Co.	$2S.A.	Jan. 2, 30	.....	.....	.....	.....	.....	.....
79⅞	64⅛	74⅞	66⅛	2,400,000	25	Ohio Oil Co.	‡50cQ	Mar. 15, 30	1,000	73	73⅛	71	72½	— ⅛
105½	103¾	108	103	600,000	100	do pfd.	$1.50Q	June 14, 30	200	107	107	107	107	— ⅛
44½	18⅝	32	20	400,000	25	Penn Mex. Fuel Co.	$1	Dec. 14, 29	200	24⅛	24⅛	24	24	0
50	29	33	21⅜	160,000	25	Solar Refining Co.	$1.25S.A.	Dec. 20, 29	100	22	22⅛	22	22¼	+ ⅛
23½	13	20⅛	13	100,000	10	Southern Pipe Line Co.	$1	Mar. 1, 30	100	20⅝	20⅝	20⅝	20⅝	— ⅛
60¼	35⅛	45⅞	37½	1,200,000	25	South Penn Oil Co.	‡50cQ	Mar. 31, 30	800	39⅝	40⅝	39⅜	39⅝	0
70	45	64	50	35,000	50	Southwest Pa. Pipe Lines	$1Q	Apr. 1, 30	50	51	51	51	51	0
63	45	59⅞	49⅞	16,850,587	25	S. O. Indiana	62½cQ	Mar. 15, 30	12,100	54⅞	56⅛	54⅛	54½	— ⅛
46⅞	29	40½	33¼	2,577,124	10	S. O. Kentucky	40cQ	Mar. 31, 30	6,700	36	36⅜	35⅛	35½	— ½
50¼	40	48⅞	44⅛	188,159	25	S. O. Nebraska	‡62½cQ	Mar. 20, 30	100	48	48	48	48	0
129	60	108½	81	560,000	25	S. O. Ohio	62½cQ	Apr. 1, 30	150	94	94	90	92¾	+ ¾
124½	113½	122	117⅝	70,000	100	do pfd.	$1.75Q	Mar. 1, 30	.....	.....	.....	.....	.....	.....
18	5⅛	10	8	34,158	25	Swan Finch Oil Corp.	....	Jan. 15, 29	.....	.....	.....	.....	.....	.....
133¾	75⅛	97⅞	85⅞	5,139,887	25	Vacuum Oil Co.	$1Q	Mar. 20, 30	6,700	89½	91⅜	89	89⅜	— ⅛

*New high †New low ‡Also extra

Independent Oils on New York Curb

1929 High	1929 Low	1930 High	1930 Low	Par Value	Companies	Transactions Sales	Week First	Week High	Week Low	Ended Last	May 17 Change
.72	⅛	⅜	⅛	$1	Amer. Contr. Oilfields	18,700	¼	¼	⅛	3/16	— 1/16
8⅝	1⅛	4½	1½	5	Amer. Maracaibo	61,500	4⅛	4½	4	4⅜	+ ¼
4¾	1	1⅜	1⅜	10	Argo Oil	.....	.....	.....	.....	.....	.....
26	3¾	16¾	8¾	N.P.	Arkansas Nat. Gas	3,800	13½	13½	12⅝	12¾	— ¾
24¾	6½	16⅝	8⅝	N.P.	do Class A	29,700	13⅛	13⅜	12⅜	13	— ⅜
9	4	8⅛	7⅝	10	do pfd.	900	8	8	8	8	0
70	50	28½	28½	N.P.	British American Oil	.....	.....	.....	.....	.....	.....
4⅞	⅞	2¾	¾	¼	Carib Syndicate	2,500	2	2⅛	1⅞	1⅞	— ⅛
68½	20	44¼	26½	N.P.	Cities Service	318,700	36½	38¼	35⅝	37	+ ¾
99¼	84	93⅞	88	100	do pfd.	1,000	92⅞	93⅜	92⅜	93⅜	+ ⅜
9¼	8	9	8¼	10	do pref. B	200	8½	8½	8⅜	8⅜	— ⅛
96	81	85	82	100	do pref. BB	.....	.....	.....	.....	.....	.....
1½	⅛	⅛	⅛	1	Colombia Syndicate	4,500	½	½	1/16	½	— ⅛
15	3⅞	8¼	5⅛	N.P.	Colon Oil Corp.	400	6	6	5¾	5¾	+ ⅛
....	....	21	11½	N.P.	Columbia Oil & Gas	32,400	17	18½	†11½	15	— 1⅜
11⅜	2½	5⅞	3⅞	10	Consolidated Royalty	1,100	4¼	4¼	3⅞	4¼	+ ¼
135	42	74¾	45	N.P.	Cosden Oil Co.	3,400	58	58	55	56½	0
87	55	70	61	100	do pfd.	.....	.....	.....	.....	.....	.....
2½	¼	1	¼	N.P.	Crown Central Pet.	200	⅜	⅜	⅜	⅜	0
11¾	4	....	....	N.P.	Crystal Oil	.....	.....	.....	.....	.....	.....
51⅛	51⅛	....	....	100	do pfd.	.....	.....	.....	.....	.....	.....
26	6½	12⅞	7¼	N.P.	Darby Petroleum	1,400	10¾	10⅞	10¼	10¼	+ ⅜
....	....	21¾	21½	N.P.	do new	800	21⅝	21¾	21½	21¾	+ 3/8
11	2	11	4½	N.P.	Derby Oil & Refg.	2,200	9⅜	9⅜	8⅛	8½	+ ¾
44	17	60	30	N.P.	do pfd.	.....	.....	.....	.....	.....	.....
....	....	12	12	10	Devonian Oil	.....	.....	.....	.....	.....	.....
209	115	166⅞	131¼	$25	Gulf Oil Corp.	14,900	153¾	155½	149⅛	150½	— 1½
7½	1⅛	4	2⅞	N.P.	Homaokla Oil	900	4	4	4	4	0
....	....	47½	35	N.P.	Indian Territory A.	9,400	39	39	38¼	38¼	— ¾
....	....	53½	35⅛	N.P.	do B.	22,100	39	39	38¼	38¼	— ¾
2⅞	⅜	1¾	¾	10	Intercontinental Pet.	9,900	1⅜	1⅜	1¼	1⅜	+ ⅛
3⅝	1¼	3	1⅞	N.P.	Kirby Petroleum	.....	.....	.....	.....	.....	.....
6⅛	1	4¾	1⅛	N.P.	Leonard Oil & Dev.	4,800	2⅞	3	2¾	2¾	— ⅛
38⅞	18	29	18⅜	N.P.	Lion Oil Refg.	4,900	26	27¾	26	26	— ⅞
67⅞	28	55⅞	34⅛	N.P.	Lone Star Gas	9,300	49¾	54⅞	49½	54½	+ 5½
....	....	31	28½	$25	MacMillan Petrol.	.....	.....	.....	.....	.....	.....
2⅞	¼	⅛	¼	1	Magdalena Synd.	3,800	⅜	⅜	1/16	⅜	0
38½	14	16	12	N.P.	Margay Oil	.....	.....	.....	.....	.....	.....
6⅜	2¼	7½	2	N.P.	Mexico Ohio Oil	100	3½	3½	3½	3½	+ ¼
....	....	11⅞	7⅞	N.P.	Middle States A.v.t.c.	4,800	9½	9¼	8¾	9⅜	— ¼
....	....	6	4⅛	N.P.	do Class B. v.t.c.	3,700	4⅝	4⅞	4¼	4½	0
42	8	32	18⅞	5	Missouri-Kansas P.L.	58,900	32⅞	33⅞	32⅛	33⅜	+ 1⅜
1⅛	¼	¾	½	1	Mountain & Gulf Oil	1,400	½	½	½	½	— 1/16
22⅞	7	12⅛	8	10	Mountain Producers	4,800	10⅞	10⅞	10½	10½	— ⅜
43⅞	24	36¾	25⅛	N.P.	Nat. Fuel Gas	4,400	34⅞	40⅞	34⅜	38⅜	+ 4¼
5	2¼	3½	2½	$5	New Bradford Oil	1,900	2¾	2¾	2⅜	2¾	0
4¾	3⅛	3⅛	3	10	New England Fuel	.....	.....	.....	.....	.....	.....
24½	11⅛	16⅞	10⅛	25	N. Y. Pet. Royalty	.....	.....	.....	.....	.....	.....
18½	6⅛	11¼	6⅞	N.P.	North Central Texas	1,000	9	9½	9	9½	+ ½
19¼	8⅛	11⅜	8⅛	N.P.	Oilstocks Ltd. A	1,500	10	10⅛	10	10	0
18¼	8½	11	8½	N.P.	do B.	.....	.....	.....	.....	.....	.....
26⅝	12⅛	19½	12½	N.P.	Pacific Western Oil	1,100	16¾	17¼	16¾	17	+ ¾
3½	½	2½	1	N.P.	Pandem Oil	13,900	1½	1⅝	1¼	1½	— ⅛
10½	2¼	4⅜	1⅞	N.P.	Pantepec Oil	2,800	2⅞	3	2⅞	3	+ ⅜
25½	13⅛	13⅜	13⅛	$25	Paragon Refg. B. ctfs.	.....	.....	.....	.....	.....	.....
28	17	29	19⅛	N.P.	Petroleum Corp.	30,500	26	27¾	25¾	26½	+ ½
....	....	5⅞	4¼	....	do warrants	8,100	5¼	5⅜	5	5⅜	+ ⅛
37	22	27½	21½	N.P.	Plymouth Oil	100	22	22	22	22	— ⅛
16	9	10½	9	$5	Red Bank Oil	300	10	*10½	10	10½	+ ½
8⅛	1⅛	5⅜	2⅛	N.P.	Reiter-Foster Oil	800	3¾	3¾	3½	3½	— ⅜
25¼	19	23½	21	25	Richfield Oil pfd.	.....	.....	.....	.....	.....	.....
29	13	18⅛	15	N.P.	Root Refining pr. pfd.	100	17	17	17	17	0
11	3	8⅜	3⅜	N.P.	Ryan Consolidated	5,100	6½	*8⅝	6⅝	7	— 1⅛
5⅞	1⅞	2½	1½	10	Salt Creek Consol.	700	1⅞	1⅞	†1½	1¾	— ¼
25⅞	9	15¼	10	10	Salt Creek Producers	1,000	12¼	13	12⅝	13	+ ½
33⅛	10	....	....	25	Shreveport El Dorado	.....	.....	.....	.....	.....	.....
....	....	39⅛	39	25	Signal Oil & Gas A.	.....	.....	.....	.....	.....	.....
24	9	17	9	N.P.	Southland Royalty	3,600	13⅞	13⅞	12¾	12⅞	— ¾
12	4	10	5½	5	Sunray Oil	1,200	7½	7⅞	7¼	7¼	0
23	7⅛	14¼	8⅜	N.P.	Texon Oil & Land	300	10½	10½	10⅜	10⅜	— ¼
81⅛	8⅞	16	8	10	Venezuela Mexico	.....	.....	.....	.....	.....	.....
6½	1⅛	4½	2¼	5	Venezuela Petroleum	4,700	3⅛	3¼	3	3	0
9⅛	2	4⅜	2	1	Woodley Petroleum	2,400	4⅛	4½	4⅛	4½	+ ⅛
5⅜	¼	2½	½	N.P.	Y Oil & Gas	100	1½	1½	1½	1½	0

*New High †New Low

New York Bonds

Week Ending May 16,

	High	Low	Last	Change
Assoc. Oil gold 6s	103	103	103	+ ½
Atlantic Refg. deb. 5s	102	101¾	102	0
Cal. Pet. 5s	100	99¼	99¼	0
Cal. Pet. 5½s	102½	102	102	— ⅛
General Pet. 5s	101⅜	101⅜	101⅜	0
Humble Oil & Refg. 5s	101½	101	101¼	— ⅛
Humble Oil & Refg. 5½s	102	101¾	102	0
Pan Amer. P & T 6s	107¾	104	106¾	+2 ⅛
Pan Amer. P & T 6s	98½	96¾	96¾	— ⅛
Phillips Pet. 5½s	97	96½	96½	— ⅛
Pure Oil 5½s	100½	100	100	— ⅛
Shell Union Oil 5s	97¼	96	97	0
Shell Union Oil 5s with war.	101	99½	99	+2
Sinclair Con. Oil 7s	103¾	103¾	103¾	— ⅛
Sinclair Con. Oil 6½s	102½	101¾	102	— ⅛
Sinclair Con. Oil 6s D	100⅝	100⅜	100⅝	+ ⅛
Sinclair Con. Crude 5½s	100¼	99¾	100	— ⅛
Sinclair Pipeline	98	97	97	—1
Skelly Oil 5½s	96⅛	95¾	96	— ⅛
S. O. N. J. 5s	103½	102½	103	— ⅛
S. O. N. Y. 4½s	98	97½	97½	— ⅛
Union Oil of Calif. 5s C.	100	99⅞	100	0
Union Oil of Calif. 6s A	108¼	108	108¼	+ ⅛
Warner-Quinlan 6s	92½	92	92	— ½
White Eagle Oil 5½s	106½	106¼	106¼	+ ⅛

New York Curb Bonds

Week Ending May 16

	High	Low	Last	Change
Cities Serv. 5s '66	85⅞	85¼	85⅝	+ ⅛
Cities Serv. G. 5½s '42	87½	87	87½	0
Cities Serv. G. P. 6s '43	93¼	92¾	93	0
Cont. Oil 5¼s '37	96	96	96	0
Empire O & R 5½s '42	87	86¾	87	— ⅛
Gulf Oil 5s '37	101½	101	101¼	0
Gulf Oil 5s '47	102	101¾	102	— ⅛
Indep. Oil 6s '39	106⅜	105	105	— ½
Pure Oil 5½s '40	98½	98	98½	— ⅛
Sun Oil 5½s '39	102½	102	102½	+ ⅛
Union Oil of Cal. 5s '45	100	99½	99¾	— ⅛
Valvoline Oil 7s '37	103	103	103	0

Oil Dividends

Amount	Payable	Stock of Record
Chesebrough Mfg. Co. q. $1	June 30	June 9
do extra 50c	June 30	June 9
New York Transit q 40c	July 15	June 20
Northern Pipe Line q $2	July 1	June 13
Paragon Refining A q 75c	July 1	June 20
Prairie Oil & Gas q 50c	June 30	May 31
Prairie Pipe Line q 75c	June 30	May 31
do extra 50c	June 30	May 31
Royal Dutch final 14%	.....	.....
Shell Transport final 15%	.....	.....
Shell Union Oil q 35c	June 30	June 4
do pfd. q $1.37½	July 1	June 10
Sinclair Cons. q 50c	July 15	June 14
Southwest Pa. Pipe Lines q $1	July 1	June 16
S. O. Kansas q 50c	June 16	May 24
Union Tank Car q 40c	June 2	May 20